

JOURNAL of the American Veterinary Medical Association

FORMERLY
AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n)

EDITED AND PUBLISHED FOR
The American Veterinary Medical Association

CONTENTS

Editorial	1
Papers:	
Further Studies on the Pathology of the Reproductive Organs in Sterility— E. T. Hallman	8
Diseases of the Bull Interfering With Reproduction—W. W. Williams....	29
Surgery of the Udder in Dairy Cows—R. L. West.....	43
The Occurrence of Epithelial Tumors in the Domesticated Animals—S. A. Goldberg	47
Some Notes on the Comparative Study of Veterinary Medicine in France and the United States—L. A. Merrill.....	64
Anesthetics in Veterinary Operations—R. R. Dykstra.....	74
The Treatment of Cryptorchidism—E. E. Wegner.....	80
Prolapsus Recti and Prolapsus Uteri and Vaginae in Dogs—J. C. Flynn....	91
Clinical and Case Reports:	
Necrobacillosis in Fish—Hadleigh Marsh.....	97
Abstracts	98
Army Veterinary Service.....	101
Association News:	
Proceedings of Fifty-seventh Annual Meeting, American Veterinary Medical Association	107
Echoes of the Columbus Meeting.....	123
Other Meetings	125

THE JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION is issued the first of each month. Manuscripts and copy for insertion should be as nearly perfect as possible for the printer and should be received by the tenth of the preceding month to insure insertion in the next month's issue. Volumes begin in April and October.

Communications relating to publication, subscriptions, advertisements and remittances should be addressed to JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION, 1620 Hobart St., Washington, D. C. Matters pertaining to the American Veterinary Medical Association and membership should be sent to Dr. N. S. Mayo, Secretary, 3133 Ravenswood Avenue, Chicago, Illinois.

\$4.00 per annum

Foreign, \$5.00; Canada, \$4.25

Single Copies 40 cts. in U. S.

Entered as Second Class Matter, February 4, 1910, at the Post Office at Washington, D. C., under Act of March 3, 1879. Acceptance for mailing at special rate provided for in Section 1103, Act of October 3, 1917; authorized February 4, 1920.

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JOURNAL

OF THE

American Veterinary Medical Association

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(Original Official Organ U. S. Vet. Med. Ass'n.)

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Reprints should be ordered in advance. A circular of prices will be sent upon application.

VOL. LVIII, N. S. VOL. 11

OCTOBER, 1920

No. 1

OUR NEWLY ELECTED PRESIDENT

DR. DAVID S. WHITE, the newly elected President of the American Veterinary Medical Association, is known personally to many readers of the JOURNAL. His father was from Louisiana and his mother was a Northern woman. "Dave," as he is best known to his friends, is the product of a happy blending of admirable qualities that characterize the people of these two sections of the country. He was born on September 28, 1869, at West New Brighton, Staten Island, New York. He received his early education in private schools on Staten Island and in the public schools of New York City. In 1886 he took up a general course of study at the Ohio State University but transferred to the Veterinary Department of that institution in 1888 and was graduated in June, 1890.

Throughout his course of study at the Ohio State University, Dr. White showed marked ability as a student and it was fortunate for veterinary education in this country that he was able to satisfy his ambition to become an educator. With this object in view, he sailed for Europe in September, 1890, to continue his studies in veterinary medicine under the most eminent teachers in the profes-



PRESIDENT DAVID S. WHITE

sion. His first year abroad was spent at Hanover, Germany, attending lectures under Babe in pathology and under Lustig in the clinics for large animals. In September, 1891, he went to Berlin and took up scientific work under Schutz, Dieckerhoff, Möller and Fröhner. While at the University of Berlin he also studied in Virchow's laboratory under Israel and in Koch's laboratory under

Günther. From Berlin he went to Vienna, where he studied surgery and ophthalmology under Bayer and attended clinics for large animals under Schindelka. In the latter part of 1892 he entered the veterinary school in Dresden to study pathogenic bacteriology and pathology under Johne and at the same time he took Lungwitz's course in horseshoeing and attended Siedamgrotski's clinics.

On his return to the United States in 1893, Dr. White was appointed Assistant in Veterinary Medicine in the Ohio State University. When the university was reorganized in 1895, he was appointed Dean of the Veterinary College and has held the position continuously since that time. In June, 1896, Dr. White was married to Nellie E. Smith of Marietta, Ohio. One daughter, now married, was born to them.

In July, 1917, Dr. White was appointed a member of the Veterinary Advisory Board to the Surgeon General of the Army. On October 4, 1917, he was commissioned major in the Veterinary Corps of the National Army and placed in charge of veterinary supplies and equipment with headquarters at Washington, D. C. On July 10, 1918, he was promoted to the rank of lieutenant colonel and ordered overseas. On August 29, 1918, he was made Chief Veterinarian of the American Expeditionary Force in France. While serving in this capacity, Lieutenant Colonel White succeeded in having the Veterinary Corps transferred from the Quartermaster Corps, under which it was operating in France, to the Medical Department. The reorganization of the service in France was in conformity with the veterinary organization in effect in the United States. On October 23, 1918, Lieutenant Colonel White was promoted to the rank of Colonel and soon after was ordered to England on business in connection with the veterinary service. During his stay in England he was the guest of the Royal Army Veterinary Corps. On February 11, 1919, Colonel White received at Camp Dix, New Jersey, an honorable discharge from the service and returned to the Ohio State Veterinary College to resume his duties as Dean, and again became known to his students and friends as Dr. White.

Colonel White was among those who acquired distinction for meritorious service in the war with Germany. From France he received the decoration "Officier de la Legion d'Honneur," from England the "Commander of St. Michael and St. George," and he was made an Honorary Associate of the Royal College of Veterinary Surgeons (London). Colonel White values highly these marks of

distinction, but he prizes most highly of all the honor of being the first veterinarian in the United States Army to be raised to the rank of Colonel.

Dr. White has not confined his activities to the class room. In addition to raising the Ohio Veterinary College to one of the highest in rank among the veterinary colleges of this country, he has acquired an enviable reputation as a fluent speaker and an able writer. He is the author of a text-book entitled "The Principles and Practice of Veterinary Medicine" and in conjunction with Dr. Paul Fischer translated Malkmus's "Veterinary Diagnostics."

Dr. White has always been an ardent exponent of higher veterinary education in this country. As an educator, the value of his wise teaching is reflected in benefits to the livestock industry in practically every State in the Union through the graduates of his college who are following successfully the practice of their profession. It is gratifying that the American Veterinary Medical Association has chosen such an able man as its President, and the JOURNAL wishes him a successful administration.

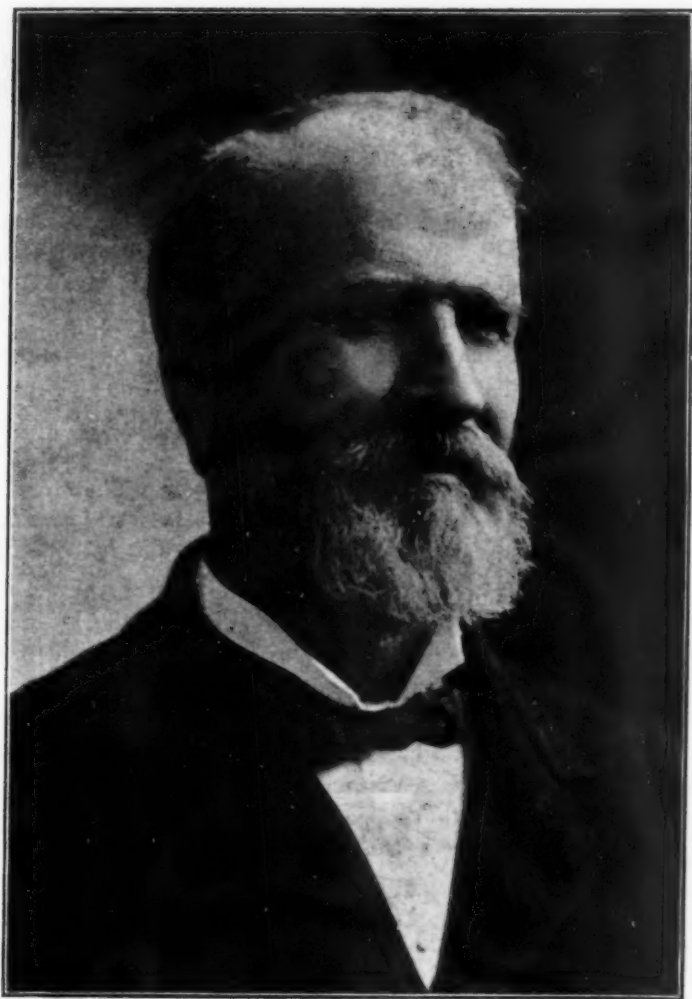
THE PASSING OF A GRAND OLD MAN

JAMES WILSON, former Secretary of Agriculture, who passed away August 26 at his home in Iowa at the ripe age of eighty-five years, leaves behind him the record of a long life of useful service to agriculture, to the nation and to his fellow man.

Born in Scotland in 1835, he came to America with his parents when he was sixteen years old, and a few years later settled in Iowa and engaged in farming. From the beginning he was a farmer of the progressive type, recognizing the importance of purebred stock and good methods of feeding. He soon became a leader in his community and was elected to the State legislature. Later he served three terms in Congress, beginning in 1873. During part of that period he was a regent of Iowa University. From 1890 to 1897 he served as Professor of Agriculture in the Iowa State College and as Director of the Experiment Station.

Mr. Wilson's most notable service was as Secretary of Agriculture from 1897 to 1913 under Presidents McKinley, Roosevelt and Taft. His occupancy of that position for sixteen years established a record for the greatest length of service of a cabinet officer. His administration of the Federal Department of Agriculture was marked by great development and progress. On entering the Department he found a force of 2,444 employees, and he left it with nearly 14,000.

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JAMES WILSON

Former Secretary of Agriculture, who died August 26, 1920

Combining a practical knowledge of agriculture with an appreciation of science, he encouraged scientific research and knew how to make the results available in practice. Among the important developments which featured his administration were the importation of useful plants such as alfalfa and durum wheat, the development of the beet-sugar industry, undertaking the control and eradication of animal diseases, enlarging and improving the meat inspection, the passage and enforcement of the pure food and drugs law, forest

conservation, and the discovery of anti-hog-cholera serum. He was a real friend of the farmer. So unassuming and friendly was his nature that the humblest farmer visiting Washington could have ready access to his office.

Secretary Wilson took a special interest in stock raising and veterinary service. He was willing to accept and act upon the professional judgment of the veterinary officials of the Bureau of Animal Industry, and he gave them his firm and unwavering support in carrying out measures decided upon as necessary or wise. In launching and prosecuting the gigantic task of eradicating the southern cattle ticks, and in stamping out two extensive outbreaks of foot-and-mouth disease, all of which aroused strong opposition, he courageously resisted popular clamor and political pressure, feeling confident that the results would justify his course. An instance of his deep concern for the welfare of the American livestock industry was revealed in a statement that he made after retiring from office. He said that in his whole official career nothing had ever caused him so much anxiety as the discovery of the infection of surra in an importation of Brahman cattle from India while held in quarantine after landing in this country. He said that he walked his bedroom floor, unable to sleep.

One who was privileged to serve under Secretary Wilson throughout his entire administration may be permitted to quote here the following letter which was written to him on the occasion of his eighty-fifth birthday, a short time before his death:

"DEAR MR. SECRETARY:

"There are many of us yet in the Bureau of Animal Industry who served under you a part or all of the time you were Secretary of Agriculture. We recall with tender feelings of personal regard your able administration of the affairs of the Department, your keen foresight in envisaging the needs of agriculture, your staunch support in enabling us to carry out the policies formulated, your sympathetic attitude and wise counsel, the confidence you reposed in your subordinates and your appreciation of their efforts to help you make the Department of Agriculture the greatest institution of its kind in the world.

"It is with pride that we recall the achievements of the Bureau of Animal Industry during the sixteen years you were with us. Accept our congratulations on your eighty-fifth birthday, and be assured of the continuance of our gratitude, respect and admiration. May you be spared many more years to enjoy with us the benefits of your successful endeavors.

Yours sincerely,

"J. R. MOHLER,
"Chief of Bureau."

While we were attending the Columbus convention of the A. V. M. A. a message came from the present head of the Department of Agriculture, Secretary Meredith, asking us to attend Secretary Wilson's funeral as a representative of the Department of Agriculture. It is a matter of regret that the time was too short for executing this commission and paying this last tribute of respect.

FOOT-AND-MOUTH DISEASE RESEARCH

A special cable from London to the *Washington Post* contains the following interesting information:

Novel features characterize a series of experiments which are about to be made by the British Ministry of Agriculture in connection with the movement to exterminate foot-and-mouth disease among cattle in England, where numerous sporadic outbreaks have occurred during the last few years.

One of the novel features is that the work will be done at sea, in view of the fact that foot-and-mouth disease is so highly contagious and no chances will be taken that would make possible its spread. It is the purpose of the Admiralty and the Ministry of Agriculture that obsolete vessels be used for the experiments, and that these vessels be equipped with laboratories and all facilities for the carrying out of the work. Officials believe valuable data will be obtained which will be of great benefit to stock breeders. For example, it may be found that certain breeds of cattle are immune from foot-and-mouth disease, just as certain varieties of potatoes are immune from wart disease. In this connection it was recalled that the work of the foot-and-mouth commission in India in 1912 was rendered abortive by the discovery that Indian cattle were not subject to the disease.

In this issue we begin the publication of the proceedings of the recent Fifty-seventh Annual Meeting of the American Veterinary Medical Association and the papers which were read at that gathering. These will be continued from month to month as rapidly as space will permit. It is expected that the entire proceedings will be completed within a shorter time than was possible in the case of the preceding convention.

The announcement that the law does not permit the prescribing of alcoholic liquors for animals will be sad news to many stable attendants.

FURTHER STUDIES ON THE PATHOLOGY OF THE REPRODUCTIVE ORGANS IN STERILITY¹

By E. T. HALLMAN

Animal Pathologist, Michigan Agricultural Experiment Station

THE material for this paper was obtained from four herds of cattle in which abortion disease has been a more or less serious problem for the last six or eight years.

The bacteriological investigations in connection with these cases were conducted by the Department of Bacteriology. To Dr. Bandeen is due the credit for the work on the first seven cases and to Dr. Stafseth for the work on the remaining four. An effort was made in each case to demonstrate the abortion bacillus. Cultural examinations and guinea-pig inoculations were made from the surface of the uterine mucosa in the first seven cases, and in the latter four cases, in addition to the above, from material obtained from the deeper layers of the mucosa. After searing the surface with a hot iron, areas were selected which appeared pathologic and small pieces of tissue from the deeper layers were removed and ground in a mortar with sterile sand and physiological salt solution. Cultures and guinea-pig inoculations were made from this material.

Not only were the guinea pigs subsequently killed and carefully autopsied, but appropriate tissues were taken from the guinea pigs and tested culturally for *Bacterium abortus* and their blood was tested with the complement fixation and agglutination test for *Bacterium abortus* antibodies. All results were negative in so far as *Bacterium abortus* was concerned.

CASE 808

Case 808 was purchased as a yearling September 7, 1917, at which time her blood was negative to abortion tests. September 23, 1917, 25 c. c. of live culture of *Bacterium abortus* were injected subcutaneously. A positive reaction to the complement-fixation and agglutination tests developed October 5, 1917, and her blood remained positive until the animal was killed.

This animal was bred first November 1, 1917, and on several occasions afterwards, but failed to conceive. Subsequent to February 22, 1918, the animal was more or less constantly in heat. An

¹ Published with the permission of the Director of the Michigan Agricultural Experiment Station.

examination on March 12, 1918, demonstrated a muco-purulent discharge in vagina and a cystic left ovary. The cyst was crushed and the uterus douched, but there is no record of what was used in uterus. There are no records of any subsequent treatment. Animal was slaughtered August 9, 1918.

Macroscopic examination: Vagina contains a considerable quantity of clear mucus not unlike the mucus of estrum. External os closed. There is a small amount of adhesive mucus in cervical canal. Uterine body $3\frac{1}{2}$ cm. in length; mucosa contains no cotyledons; lumen small; wall apparently thickened and fibrous. Mucosa of horns yellowish gray and moist, cotyledons 3 to 5 mm. in length and 3 mm. in width. Oviducts apparently normal. Right ovary $2\frac{1}{2}$ cm. in length and contains a cyst about the size of a hazelnut; left ovary, about 2 cm. in length and shows a cicatrix extending around its dorsal border, transverse to the long axis of the ovary.

Bacillus coli communior was obtained from the cystic ovary. Cultures from the uterus were negative.

Histological examination: The mucosa of the posterior cervix in places is covered by a stratified epithelium varying in thickness from 65 to 150 microns. The superficial cells show marked mucoid changes. Cyst-like structures averaging about 25 microns in diameter, containing a mucoid material, are observed in the epithelium. A part of the mucosa of the posterior cervix is covered by a simple epithelium 20 to 25 microns high. Here there are numerous tubular depressions simulating wide, shallow glands. Practically all of the cells lining these tubules show mucoid changes.

The mucosa of the middle cervix shows the same extensive mucoid changes in the epithelium.

The structure of the wall of the uterine body is unlike that of the normal body, but is similar to that of the anterior end of the cervix. At only one point is there seen a group of uterine glands (about 40 in number) in the deeper portion of the stroma. All other portions show an absence of distinct uterine glands. The epithelium is arranged similarly to that of the anterior cervix and shows considerable mucoid changes, though not as extensive as that of the cervix. The uterine wall is not differentiated into a distinct mucous membrane and a muscular coat, but the muscularis blends with the stroma of the mucosa as is the case in the cervix.

The mucosa of the horns averages about $3\frac{1}{2}$ mm. thick and is covered by an epithelium 16 microns high. There are no epithelial

defects. The tissue of the cotyledons extends from 1 to 1.3 mm. into the stroma.

In the gland mucosa the subepithelial tissue is only very slightly more cellular and apparently more reticular than the more deeply lying stroma. There are about 75 cross-cut gland tubuli per square millimeter, varying in diameter from 40 to 80 microns. In a great many of the glands the epithelium is surrounded by a clear zone as if the glandular epithelium had contracted away from the periglandular tissue. For example, glands 50 microns in diameter are in a clear zone 75 microns in diameter. A few goblet cells are present and numerous small round cells are seen in the lumen of some of the gland tubules.

CASE 996

Case 996 was born May 28, 1916. On November 9, 1917, blood was positive to abortion test. On March 31, 1918, she gave birth to an apparently normal calf after a prolonged labor. A few days after this a vaginal discharge was observed and examination demonstrated considerable pus in the uterus. The uterus was douched daily for three weeks with a weak solution of a coal-tar disinfectant. During the last week of treatment an ulcerated cervix was treated by swabbing at intervals of two days with 50 per cent tincture of iodine in glycerine, four treatments being given. The animal apparently recovered. At the beginning of this treatment *Streptococcus pyogenes* and *Bacillus pyogenes* were isolated from the uterus. During the latter part of July endometritis again developed. At this time *Streptococcus pyogenes* and *Bacillus coli communior* were isolated from the uterus. The uterine discharge was of a reddish brown color and fetid odor. She was given the same treatment indicated above, and the uterine discharges ceased, but there soon developed a peri-uterine abscess. She was slaughtered October 7, 1918.

Macroscopic examination: There is an abscess containing about 100 c. c. of thick, creamy pus, slightly to the right of the median line and between the uterine body and the rectum. The capsule wall has involved the dorsal wall of the vagina and the uterus and the ventral wall of the rectum so that the rectum is dissected from the vagina and the uterine body with difficulty. Externally the left oviduct is apparently normal. The ovarian end of the right oviduct is involved in the abscess capsule. The left ovary is covered by the peritoneum and shows a few immature follicles on the surface. The

right ovary is completely ensheathed in fibrous tissue that is a continuation of the abscess capsule. In the broad ligament there are several abscesses containing a thick, creamy pus and varying in size up to as large as a hazelnut.

The cervical canal is $5\frac{1}{2}$ cm. in length; mucosa apparently normal. The uterine body is 2 cm. in length. The uterine cavity contains no excessive exudate and the mucosa is moist and glistening. It is of a grayish chocolate color, but not entirely uniform; around some of the cotyledons it is apparently more vascular. The cotyledons vary in size from 3 to 6 mm. in diameter, and those of the left horn are apparently more vascular.

Histological examination: The mucosa of the external cervix is covered in places by an epithelium 25 microns thick and 4 cells deep. In other places it is covered by simple epithelium and only 6 microns in depth. Whether this is the result of incomplete development of the epithelium subsequent to cervicitis is a question. There are no other epithelial defects. There is no sub-epithelial cellular zone. The mucosa of the middle and anterior cervix is covered in places by an epithelium 35 microns deep and consisting of 4 layers of cells. In other places the epithelium is simple and 15 microns deep. There are no epithelial defects. In a few places there is a sub-epithelial zone about 50 microns deep that is slightly more cellular than the deeper part of the stroma. Otherwise there is no differentiation between a cellular sub-epithelial zone and a deeper fibrous layer. At one point about 150 microns below the surface is an area of cells about 125 microns in diameter. These are apparently connective tissue cells in the transitional stage between fibroblasts and fixed connective tissue cells.

The mucosa of the uterine body varies in thickness from 0.6 to 1.5 mm. It is covered by a simple epithelium averaging about 15 microns high. Only a few muroid cells are seen. A differentiation into an outer cellular and an inner more loosely fibrous layer of the stroma is not distinct. The deeper portion of the stroma is more densely fibrous than is the corresponding part of the normal wall. There is a conspicuous diminution in the number of uterine glands. In some portions of the gland mucosa no glands are observed. The uterine glands vary in diameter from 25 to 40 microns.

The mucosa of left horn varies in thickness from 1 to 3 mm., averaging a little thicker toward the middle and anterior end of the horn. The epithelium is simple and averages about 20 microns high. There are no epithelial defects. The outer cellular layer

of the stroma is not uniform, but in places the more fibrous deeper portion extends to the epithelium. A few small foci of small round cells are seen in the deeper portions of the stroma. These foci vary in size from 125 to 175 microns in diameter. They consist of cells which apparently represent an intermediate stage between fibroblasts and fixed connective tissue cells. The diminution in number of glands is not as marked as in the uterine body. The mucosa of the right horn shows the same changes seen in the left horn. In addition some of the gland luminæ contain a few lymphocytes and there are a few local areas of edema in the stroma.

CASE 17

Case 17, a Red Poll heifer, 3 years old, was bred for the first time in April, 1918, and was soon turned on pasture for the summer. During the first week in December, 1918, she aborted a 4-months-old fetus. This was apparently from service in pasture during the summer. The animal was killed for beef January 21, 1919.

Macroscopic examination: Uterus not enlarged, oviducts apparently normal. Left ovary contains a corpus luteum about $1\frac{1}{2}$ cm. in diameter, also one cyst-like structure 1 cm. in diameter and several immature follicles slightly protruding above the surface. Right ovary normal. The external cervix is $2\frac{1}{2}$ cm. in diameter; the external os is closed. There is a small quantity of a turbid, slightly adhesive exudate in the external os. There is some hypertrophy of the second and third transverse folds of the cervical mucosa. The uterine body is 4 cm. in length; the mucosa has a fairly uniform light drab color. The mucosa of the right horn is not uniform in color. Portions of the gland mucosa are of a light drab color, others dark drab, giving the gland mucosa a mottled appearance. The mucosa is moist and glistening, but there is no excessive exudate. The cotyledons are 3 to 6 mm. in length and of uniform color. The mucosa of the left horn is of a lighter and more uniform color. Cultures from the uterus were negative.

Histological examination: The mucosa of the external cervix is covered by a simple epithelium 15 to 25 microns high. The sub-epithelial tissue is very slightly, if any, more cellular than the deeper-lying stroma. There is considerable mucus between the folds of the mucous membrane and in the tube-like depressions, in which are seen numerous lymphocytes. The epithelial cells show considerable mucoid changes, but not to the same extent as is seen in Case 808.

It is apparent that in this case (17) the nuclear changes are not the same as in Case 808. Here the nucleus is larger, more vesicular and more deeply stained than in Case 808. The questions arise: Is there a distinction between physiological mucus production and that seen in the catarrhal conditions? Are the latter characterized more particularly by degenerative nuclear changes?

The mucosa of the middle cervix differs from that of the external cervix only in that here the rugæ and tubular depressions are more numerous and the stroma in places is slightly more cellular. In a few of the spaces between the folds are numerous exfoliated epithelial cells. In the mucosa of the anterior cervix the mucoid changes are less conspicuous and the sub-epithelial tissue is more cellular. Near the apex of some of the rugæ the fibroblasts are so numerous that the structure simulates that of the cotyledon of the non-pregnant uterus.

The mucosa of the uterine body averages about 1.8 mm. in thickness and is covered by an epithelium 16 to 25 microns high. There are no epithelial defects other than a few lymphocytes seen passing through the membrane. There is a fairly uniform cellular sub-epithelial stratum averaging about 0.3 mm. in depth, in which moderately numerous eosinophiles are seen. A few groups of glands are seen where the periglandular tissue consists almost entirely of fibroblasts. The glandular epithelium in these groups shows no defects.

The mucosa of the right horn averages about 2 mm. thick and is covered by an epithelium 20 to 25 microns high. There are no epithelial defects except that in places numerous lymphocytes are seen passing through. There is a distinct sub-epithelial cellular zone which in places shows considerable blood pigment and numerous small round cells and eosinophiles. The latter are more numerous. There are a few foci averaging about 100 microns in diameter in which eosinophiles are the predominating cells. One focus of polymorphonuclears and fibroblasts is seen. There are a few groups of glands in the deeper layers of the mucous membrane which show a slight peri-glandular fibrosis. There are no defects of the glandular epithelium, though in the lumen of a few glands are seen numerous lymphocytes.

The mucosa of the left horn averages about 2 mm. thick and is covered by an epithelium 16 to 25 microns high. There is a fairly uniform sub-epithelial cellular zone averaging about 0.2 mm. deep.

There are no defects of the glands, although there is a slight periglandular fibrosis in a few places. At one point involving an artery with a lumen of 140 microns and a wall 80 microns thick there is a crescent-shaped area of what appears to be transitional fibroblasts that extends about one-third the distance around the artery. At one point this area involves about one-half the thickness of the arterial wall. At its thickest portion it is 90 microns and gradually diminishes to a point at each end.

CASE 18

Case 18 was a Holstein cow 5½ years old. She was bred for the first time August 20, 1914, and calved May 21, 1915. After this she was bred unsuccessfully a number of times and was treated for sterility, but records do not show the nature of the treatment. She was then bred January 27, 1916, and calved October 28, 1916. The records show the following service dates: September 17, 1917; January 3, 1918; February 14, 1918; March 10, 1918; August 8, 1918. There were no known abortions during this time. The animal was slaughtered January 27, 1919.

Macroscopic examination: There is a cyst 4 cm. in length and 1¼ cm. in diameter projecting above the surface of the floor of the vagina 19 cm. posterior to the external os. The cervical canal contains a small quantity of clear, slightly adhesive exudate. The posterior transverse fold of the cervical mucosa is considerably enlarged in its lower portion. The left lateral portion of the third fold is also enlarged, but not to the same extent as is the posterior fold. The body of the uterus is 2 cm. in length, the mucosa fairly uniform in color. The mucosa of the left horn is of a light chocolate color, though some portions show a little more blood pigment than others. The cotyledons are normal in appearance. The gland mucosa around the cotyledons in the right horn is a little more vascular than usual. Both oviducts are apparently normal. The right ovary contains a corpus luteum 1½ cm. in diameter, in the center of which is a cyst 6 mm. in diameter. The left ovary contains a cyst-like structure 1 cm. in diameter. Cultures from the uterus and ovaries were negative.

Histological examination: Other than slight mucoid changes in the cervical epithelium and a fibrous thickening of the transverse cervical folds, no histological changes could be detected in the uterine mucosa.

CASE 20

Case 20 was a grade Shorthorn cow about 6 years old. Her last calf was born in January, 1917. She was bred during the late spring or early summer of 1917 and was thought to be with calf. There was no known abortion, but during the spring of 1918 she began to come in heat, first irregularly, but later, during the summer and fall, quite regularly. She has been bred persistently, with failure to conceive. She was slaughtered February 11, 1919.

Macroscopic examination: External cervix is 3 cm. in diameter. External os closed. There is a considerable quantity of clear, only slightly adhesive exudate in the external os and covering the posterior end of the cervix. The cervical canal is $6\frac{1}{2}$ cm. in length. The transverse folds of the mucous membrane are normal, but there is an appreciable quantity of rather adhesive exudate in the canal. The body of the uterus is $4\frac{1}{2}$ cm. in length. The mucosa is of a light gray uniform color. The cotyledons are 3 mm. in diameter. The mucosa of the horns is similar to that of the uterine body, with an occasional more slightly vascular area. The color of the mucosa is more like that of a heifer's uterus than that of a cow's that has calved. Both oviducts are apparently normal. The left ovary is 4 cm. in diameter, spherical in shape, and has a protruding corpus luteum 2 cm. in diameter. The right ovary is 4 cm. in diameter, and has one cyst 2 cm. in diameter and several smaller ones. Cultures from the uterus were negative. *Bacillus coli communior* was isolated from the cystic ovary.

Histological examination: Only slight mucoid changes are observed in the cervical epithelium. Otherwise the cervical mucosa is normal. In the mucosa of the uterine body the sub-epithelial cellular layer is not uniform but in places is indistinct. There is apparently but little fibrosis but some local edema. A few foci of small round cells are seen in the mucosa. There are no glandular changes. The mucosa of the horns does not differ from that of the uterine body.

CASE 21

Case 21 was a Guernsey cow, born May 16, 1911. Records show the following service dates: February 27, 1913; March 30, 1913; December 20, 1913; January 12, 1914; February 3, 1914; March 10, 1914; March 30, 1914; April 10, 1914; April 27, 1914; May 5, 1914; May 27, 1914; June 30, 1914; August 9, 1914. Calved May 15, 1915. There is no record of abortion, nor do the records show

the appearance of heat between March 30, 1913, and December 20, 1913. Artificial impregnation was attempted by the manager at heat periods from December 20, 1913, to May 5, 1914, inclusive (included in service dates above), and the yeast treatment was given by him June 30 and August 9, 1914.

After calving the following service records are recorded: July 20, 1915; September 9, 1915; September 18, 1915; October 4, 1915; October 21, 1915; December 21, 1915; December 31, 1915; January 20, 1916; February 24, 1916; March 31, 1916; May 19, 1916; June 7, 1916; June 23, 1916; July 11, 1916; September 9, 1916; October 12, 1916; November 8, 1916; January 20, 1917; September 22, 1917; December 6, 1917; March 25, 1918. The yeast treatment was given at heat periods from March 31 to June 23, 1916, inclusive. On November 8, 1916, the vagina was douched with warm salt solution before service, and on September 22, 1917, soda solution was used in the vagina before service.

Some time during the spring of 1918 (date not recorded) the writer made an examination and diagnosed pregnancy, apparently of about 70 or 80 days' duration. A few weeks later another examination was made by the writer, at which time there was no evidence of pregnancy. No record was made of the clinical condition at this time. She was shortly turned out to pasture without further service to bull, and remained in the pasture until October 12, 1918. On this date the following notes were made by the writer:

"There is a small quantity of clear mucus in vagina in which are seen a few flakes of pus. On manipulation of cervix 15 or 20 c. c. of a more adhesive drab-colored exudate is forced out of cervical canal. The external os and posterior end of cervix is sufficiently dilated to allow the insertion of three fingers, although the canal is closed at its anterior end. On rectal examination it is found that the uterus is distended. The walls are tense and simulate pregnancy of the fourth or fifth month, although a fetus can not be felt. The writer is informed that the cow was not bred subsequent to his last examination the previous spring, and no bull had been with cow in pasture during the summer. The writer then proceeds to draw some 14 to 16 liters of amniotic fluid from the uterus, after which a 25 to 30 cm. fetus can be distinctly felt through the rectum. No effort was made to remove the fetus at this time, believing that it would be delivered in a few days."

On November 8, 1918, this animal was again examined and the following notes made:

"The fetus has been delivered. Uterus is still somewhat enlarged, but there is no apparent discharge."

On December 14 an examination revealed an adhesive mucopurulent discharge in the anterior part of the vagina and cervical canal. No enlargement of uterus, tone fair, small cyst in right ovary. Cyst was crushed and cervix cleansed and swabbed with Lugol's solution of iodine, and 30 c. c. of a 50 per cent Lugol's solution was injected into the uterus.

The writer did not see the case again until February 1, 1919, at which time there was a mucopurulent discharge in the vagina. The external cervix was congested and the canal open. Uterus not enlarged, and tone fair.

The owner did not care to attempt further treatment, and animal was slaughtered February 11, 1919.

Macroscopic examination: External os is dilated, cervical canal is 9 cm. long and contains a small quantity of a clear, slightly adhesive exudate. There is a slightly hypertrophy of the first transverse fold of the mucous membrane in its lower and right lateral portion. The mucosa is of a light drab color. The body of the uterus is 2 cm. in length, the mucosa of a slightly mottled, light pinkish color. Small areas of a lighter grayish color are seen. The mucosa of the posterior end of the left horn is similar in appearance to that of the body. Cotyledons are 3 mm. in diameter and are of a grayish white color, contrasting with the gland mucosa. In proximity to one cotyledon near the posterior end of the horn is a small nodule 1 cm. in diameter and projecting about 6 mm. above the surface of the mucosa, which appears to be a small tumor. The mucosa of the middle and anterior portions of the left horn is of a light drab but not uniform color. There is present a small quantity of a turbid creamy exudate. The mucosa of the right horn is more uniform and a lighter drab color than that of left horn. The same exudate as seen in the left horn is present. A small piece of flat bone, $4\frac{1}{2}$ cm. long by $1\frac{1}{4}$ cm. wide is found lying free in the anterior end of the horn. There is a cyst 1 cm. in diameter at the fenestrum of the right oviduct. The left oviduct is apparently normal. The right ovary is 4 by $4\frac{1}{2}$ cm. and has a cyst 2 cm. in diameter. The left ovary is 4 by $5\frac{1}{2}$ cm. and has a cystic corpus luteum 4 cm. in diameter. *Bacillus coli communior* was isolated from the uterus. Cultures from cystic ovaries were negative.

Histological examination: The mucosa of the posterior cervix is covered in places by a simple epithelium 20 to 25 microns high and in others by a stratified epithelium 6 to 8 cells deep and 65 microns high. The mucoid changes of the epithelium are well

marked. A faintly pinkish granular exudate containing many small round cells is adherent to the surface in places. The sub-epithelial tissue is but slightly cellular. In the middle and anterior portions of the cervix the mucoid changes of the epithelium are more extensive than in the posterior end. Here the nuclei show distinct degenerative changes. The sub-epithelial zone is distinctly cellular and shows many small round cells and polymorphonuclears. The mucosa of the uterine body averages about 2 mm. thick. The sub-epithelial cellular zone is not uniform but is absent in places. The deeper portions of the gland mucosa are not uniform. In places there is an absence of glands and the stroma is edematous. The glandless areas are not densely fibrous but are more reticular with here and there small areas of a more fibrous nature. In the glandular portion of the stroma the periglandular tissue is more cellular than is normally seen. There are no defects of the glandular epithelium but in a few of the gland tubules numerous small round cells are seen.

The mucosa of the left horn varies in thickness from 3 to 6 mm. and is covered by an epithelium 16 to 25 microns in height. There are no epithelial defects. There is not a uniform sub-epithelial zone with a deeper, more reticular stroma, but the deeper stroma is distinctly denser because of an increase of the cellular and fibrous constituents. There is considerable infiltration of the sub-epithelial tissue with small round cells and an increase in the number of connective tissue cells. However, the small round cell infiltration is not uniform and in places it has the appearance of irregularly shaped follicles. The small tumor in the posterior end of the horn described in the macroscopic examination consists of a cheesy pinkish-staining material with a few nuclei scattered throughout the cheesy material. The wall surrounding this mass is lined with low cuboidal epithelium, indicating that the nodule is due to the plugging of a gland duct with retention and inspissation of the secretions. A few of the gland tubules show some disintegrations of the epithelium with numerous small round cells in the lumen, but the majority of glands show no epithelial defects. Many of the gland tubules show a periglandular fibrosis, though this has not reached the stage of scar tissue. A few localized areas of edema are observed in the stroma. In the region of a cotyledon there is a distinct depression in the mucosa, but this does not appear to be due to cicatrization but to a vitreous degeneration and obliteration of the underlying arteries.

The mucosa of the right horn varies in thickness from 3 to 7 microns and is covered by an epithelium 16 to 25 microns high. In places there is a small amount of exudate consisting of red blood cells and leucocytes adherent to the surface of the epithelium. There is also seen in places a layer of a granular, pinkish material containing a few leucocytes between the epithelium and the sub-epithelial cellular zone. This layer is 15 to 30 microns thick. There are no marked epithelial defects except that in places there is a separation of the epithelial cells through which the granular layer above described is continuous with the surface coagulum. The sub-epithelial cellular zone is not uniform in depth, but in places extends down into the stroma and reaches the muscularis in places. There is seen here the same small round cell infiltration and periglandular fibrosis as described in the left horn. Adjacent to an arteriole 40 microns in diameter is a focus of fibroblasts about 100 microns in diameter. There is some disintegration of the glandular epithelium and small round cell infiltration observed in a few of the gland tubules.

CASE 22

Case 22 was a Guernsey cow born August 30, 1910. First served December 21, 1912, and calved normally October 2, 1913. Was again bred April 18, 1914, and calved normally February 1, 1915. Was then bred March 16, 1915, and aborted May 30, 1915. She was successively bred August 22, 1915; October 26, 1915; December 10, 1915; April 2, 1916; and aborted November 4, 1916. She was then bred January 12, 1917; February 2, 1917; February 26, 1917; March 18, 1917; April 9, 1917; May 6, 1917, and November 6, 1917. Abortion was not observed between May and November. There is no record of the case between November 6, 1917, and December 14, 1918, other than that there has been no known abortion nor has the cow calved during that time. On December 14, 1918, the following notes were recorded: "There is some cloudy mucus around external os. External cervix much congested, canal slightly dilated. Uterus not enlarged, but walls are flaccid."

The cow was slaughtered February 11, 1919.

Macroscopic examination: The external cervix is $4\frac{1}{2}$ cm. in diameter. The external os is slightly dilated and there is present a considerable amount of slightly cloudy adhesive exudate. The cervical canal is 8 cm. in length, the mucosa of a grayish drab color with a few ecchymotic areas. The body of the uterus is 5 cm. in

length, the mucosa of a darker drab and more uniform color than that of the cervix. The mucosa of the horns is similar to that of the body, with a few small areas apparently more vascular. Cotyledons are 6 mm. in diameter and of a yellowish gray color. There is a protruding corpus luteum about 6 mm. in diameter in each ovary, also a cyst-like structure in the left ovary about $1\frac{1}{2}$ cm. in diameter. The right ovary is spherical and $2\frac{1}{2}$ cm. in diameter. The left ovary is 3 by 2 cm. in size. Cultures from the uterus were negative.

Histological examination: The mucosa of the external cervix is covered in some places by a stratified epithelium 60 microns deep and in others the epithelium is simple and 25 microns high. The exudate has been washed off except between the folds of the mucous membrane; here it appears as a partly granular, partly stringy, pinkish mass in which many lymphocytes are seen. The epithelial defects are not marked, though in places there is some mucoid degeneration. The sub-epithelial tissue is quite generally fibrous with here and there slight accumulations of leucocytes. It is observed, however, that in the region of the fundus of the pits between the folds of mucous membrane the sub-epithelial tissue is more cellular. Whether this is due to greater irritation due to retarded drainage of the exudate is a question. The mucosa of the middle and anterior cervix is covered by a simple epithelium 12 to 25 microns high. Mucoid degeneration of the epithelium is marked. There are observed in the stroma a few foci of fibroblasts averaging about 200 microns in diameter. These are at an average depth of 0.5 mm. from the surface.

The mucosa of the uterine body is 5 to 6 mm. in thickness and is covered by an epithelium 25 to 45 microns high, apparently consisting of four or five layers of cells in places. There are no marked epithelial defects, though in places numerous lymphocytes are seen in the process of passing through the epithelium. The sub-epithelial cellular zone is not distinct but considerably more fibrous than in the normal uterus. Many fibroblasts and distinct foci of fibroblasts are seen in the stroma. The deeper portions of the stroma are more densely fibrous than normal, though the increased thickness of the mucosa is partly due to edema. There is a marked diminution in the number of glands. The glands are not uniformly distributed but are completely absent in places. Only a few of the glands show mucoid changes in the epithelium.

The mucosa of the left horn varies in thickness from 1.6 to 9 mm.

In the thicker portions considerable edema with leucocytic infiltration is observed. A differentiation into an outer and an inner layer of the stroma is not uniform. The sub-epithelial zone is more fibrous than normal, with distinct cicatrization in places. The uterine glands are more uniformly distributed than in the body, but more mucoid changes with some disintegration of the glandular epithelium are observed.

The mucosa of the right horn varies in thickness from 4 to 10 mm. and is covered by simple epithelium 20 to 25 microns high. There are no marked epithelial defects, though a few leucocytes are seen passing through the membrane. The stroma is not uniformly differentiated into two layers, but there is a fibrosis of both layers. Much edema of the stroma is observed, although the amount varies considerably in different portions of the mucosa. Numerous eosinophiles and lymphocytes are seen in the edematous areas. Scattered through the edematous areas are seen groups of from one to four gland tubules with occasionally an arteriole surrounded by a fibrous periglandular tissue. These groups, which are irregularly shaped and vary in size from 120 to 750 microns in their greatest diameter, stand out as islands surrounded by edematous fluid. The glandular defects are not marked, though there are slight mucoid changes in the glandular epithelium and the periglandular tissue is distinctly, though not densely, thickened. Only occasionally are there observed a few glands with atrophic epithelium and surrounded by scar tissue. Here desquamated epithelium and leucocytes are observed in the gland lumen.

CASE 23

Case 23 was a Guernsey cow; past breeding record not available, but it is known that the animal has had two or three calves and has been bred a number of times since calving with failure to conceive. On January 20, 1919, it was recorded that the external cervix was very much congested, but no abnormalities of the uterus or ovaries could be detected by rectal examination. On the above-mentioned date the cervix was swabbed with Lugol's solution of iodine. This animal was slaughtered March 3, 1919.

Macroscopic examination: There is a small quantity of a rather adhesive muco-purulent exudate in the anterior part of the vagina and external os. There is some hypertrophy of the external fold of the mucous membrane of the cervix in its lower right portion. The mucosa is not of a uniform color, but the lack of uniformity is

apparently due to some portions being more vascular than others. At the lower border of the middle transverse fold there is a fibrous tag adherent at each end to the fold, having a small opening beneath the tag. The mucosa of the anterior cervix is adherent, completely closing the cervical canal. The adhesions are not dense but apparently of recent origin. This condition is probably a sequel of the treatment administered on January 20. The body of uterus is 5 cm. in length and the wall of the body and left horn is much thinner than normal and suggests a condition of pregnancy. The left horn contains about 125 c. c. of serous exudate, but no coagulum is present. The mucosa is of a light drab but not uniform color. In some portions the vascular network is distinctly seen, indicating considerable thinning of the overlying mucosa. The cotyledons average about 3 mm. in diameter and are gray in color. The wall of the right horn is thicker than that of the body and left horn, but there is some thinning of this wall. The mucosa is similar to that of the left horn. Both oviducts are apparently normal. The right ovary is spherical, $2\frac{1}{2}$ cm. in diameter, and contains a cyst-like structure 1 cm. in diameter and several regressed corpora lutea. The left ovary is oval and is $4\frac{1}{2}$ cm. in its longest diameter and contains a cyst $2\frac{1}{2}$ cm. in diameter. *Staphylococcus pyogenes aureus* and *Staphylococcus pyogenes albus* were obtained from the surface of the mucous membrane and were also obtained from the deeper layers.

Histological examination: No tissue is saved from the cervix and uterine body. The mucosa of the left horn varies in thickness from 0.36 to 0.8 mm. (the uterine wall is only 2 to 4 mm. thick), and is covered by a simple epithelium 25 microns high. The stroma of the mucosa is not differentiated into two layers but is more densely fibrous than normal. The proportion of glands to interglandular tissue is apparently normal. A few of the glands show cellular degeneration with numerous lymphocytes in the gland luminae. Atrophy of the muscle fibers of the internal muscular coat is apparent. The mucosa of the right horn varies in thickness from $1\frac{1}{2}$ to 4 mm. and is covered by an epithelium 18 to 30 microns high. In places a few vacuoles and disintegrating cells are observed in the epithelium. The sub-epithelial cellular zone is more noticeable than in the left horn. The center of one cotyledon is depressed and appears to have undergone some induration to a depth of 150 microns. In another cotyledon there is a more deeply seated indurated area about 1 mm. in diameter. Beneath this cotyledon are numerous glands with atrophic epithelium. The condition of stroma

varies in different parts of the horn. While there is a more or less uniform diffuse fibrosis of the stroma, the stage of fibrosis varies in different portions. In places the interglandular tissue is largely fibrous; in others it consists very largely of fibroblasts indicating an active condition. Numerous small round cell foci, averaging about 250 microns in diameter, are seen both in the gland mucosa and in the region of the cotyledons. The condition of the glands varies considerably in different portions of the horn. In places the glandular epithelium is apparently normal; in others there is shrinking of the nucleus and caryorrhexis with disintegration of the cytoplasm. Here numerous small round cells are seen in the gland luminae.

In this case and the remaining three of this series an attempt was made to stain sections from different portions of the uterus for bacteria, but we were not able to demonstrate successfully their presence. In some of the sections a few scattered small spherical bodies were seen, but these were not sufficiently numerous to determine whether they were cocci or chronidia. In view of the fact that cultures were obtained from the deeper layers of the mucosa it is believed that our technique was imperfect or else there were such small numbers of bacteria that they were not recognized.

CASE 24

Case 24 was a Guernsey cow about 5 years old. This cow aborted a 7-months-old fetus in September, 1917. A few days afterwards three fetal hoofs were washed out of the uterus. She soon made an apparent recovery and was bred persistently with failure to conceive.

February 1, 1919, the author made an examination of the cow and recorded that "the vagina contains no excessive exudate. There is a little enlargement of the right horn, and right ovary contains a corpus luteum. The animal is probably, pregnant, but not sufficiently advanced to make a positive diagnosis."

February 22 an examination by the author found the animal not pregnant, but the clinical condition was not recorded. She was slaughtered March 2, 1919.

Macroscopic examination: The external os is slightly dilated. The cervical canal is $7\frac{1}{2}$ cm. in length. There is an excess of clear mucus in the canal. The first transverse fold of the mucosa and the mucosa of the anterior cervix shows quite a few petechial hemorrhages. The uterine body is $2\frac{1}{2}$ cm. in length, the mucosa of a fairly uniform light drab color. The mucosa of the left horn

is of a light drab color. The cotyledons are not numerous, and those that are present appear as a very small, slightly elevated, grayish area with a depressed center. The mucosa of the right horn is of a fairly uniform light chocolate color. Only few cotyledons are visible. Near the posterior end of the horn is a scar-like area, grayish white in color, irregularly triangular in shape, $2\frac{1}{2}$ cm. in length and 6 mm. at the base. In the anterior end of the horn there are a few hemorrhagic or acutely congested areas at the crest of the folds of mucous membrane; these areas average about 6 by 12 mm. in size. Both oviducts are apparently normal. The left ovary is 3 cm. in diameter and contains a protruding corpus luteum 1 cm. in diameter. The right ovary is oval, is 4 cm. in its longest diameter, and contains a cyst-like structure 1 cm. in diameter. A micrococcus and *Bacillus subtilis* were obtained from the surface and also from deeper layers of the uterine mucosa.

Histological examination: Sections are saved only from the posterior cervix and the right uterine horn. No abnormalities are observed in the external cervix. The mucosa of the right horn varies in thickness from 3 to 5 mm. and is covered by an epithelium averaging about 25 microns in height. The sub-epithelial cellular zone is fairly well marked, though in places it apparently extends to a greater depth into the stroma than is normally seen. Numerous lymphocytes are diffusely scattered through the stroma and in places foci of small round cells are seen. There is marked edema of the stroma and here and there evidence of proliferation of the interglandular tissue. The glandular changes are conspicuous and extensive. They vary from vacuolization of only a few cells in a gland tubule to very marked caryorrhexis with disintegration of the cytoplasm and marked round-cell infiltration of the gland lumen. Many of the cotyledons show cicatrization.

CASE 25

Case 25 was a Guernsey cow about 7 years old. As a heifer this animal was bred persistently before she conceived, and calved apparently normally during the summer of 1915. She was again bred the following December and calved in September, 1916. For the next year and a half she was bred irregularly, but never conceived; at least abortion was not observed during that time. She was treated once during the summer of 1918 and again once during the fall for a cystic right ovary. There is no record of the nature of the treatment.

February 1, 1919, the author examined this cow and made the

following notes: "There is considerable muco-purulent discharge in the anterior vagina. The external os is slightly dilated, the mucosa is moist and congested, but there is no apparent hypertrophy of the external cervix. The uterus is not enlarged; the walls are somewhat flaccid. The right ovary contains a cyst. The cyst was dislodged, uterus massaged, and cervix swabbed with Lugol's solution of iodine."

February 22 the animal was examined by the author and the following notes recorded: "There is about 100 c. c. of cloudy mucus in the anterior vagina and external os. The external os is open and the mucosa slightly congested. The uterus is not enlarged; walls flaccid. No cyst can be felt in either ovary. The uterus and ovaries were massaged and the cervix swabbed with Lugol's solution of iodine."

March 22 the following notes were made by the author: "There is about 30 c. c. of a slightly adhesive cloudy exudate in the anterior part of the vagina. The mucosa of the cervix is slightly congested, and there are a few friable adhesions in the posterior cervical canal. The left uterine horn is somewhat smaller than the right; the wall is flaccid and noticeably thinner than that of the right horn. There is a cyst the size of a hazelnut in the left ovary. No cyst can be felt in the right ovary." No treatment was given at this time, as an unfavorable prognosis was made, and the animal was slaughtered March 23, 1919.

Macroscopic examination: There is an excess of clear mucus in the anterior part of the vagina and external os. The cervical canal is $7\frac{1}{2}$ cm. in length and contains a small quantity of a clear mucus in which a few flakes of pus are seen. The mucosa is not uniform in color but shows a few injected areas. There is some hypertrophy of the right lateral portion of the second transverse fold, with a small fibrous tag attaching the apex of this fold to the opposite wall of the cervix. The body of uterus is 4 cm. in length, and the wall is abnormally thin. The mucosa is mottled, of a grayer color than normal, and in places the underlying vascular network can be easily seen. No cotyledons can be seen. The mucosa of the left horn is similar in appearance to that of the body, only here a few cotyledons are present varying in size from 3 to 6 mm. in diameter. The thinning of the wall of this horn is very noticeable. Externally the size of the horn is apparently one-half that of the right. There is a small quantity of a flocculent serous fluid in the right horn. The mucosa is of a grayer color than normal, and the cotyledons are 6 to 9 mm. in size. Their color is a mottled grayish yellow and

simulates the appearance of a cotyledon in the latter stages of involution. Near the middle of the right horn is an area about 5 cm. in diameter, the wall of which is not more than 3 mm. thick. In the center of this area is a radiating scar. The left ovary contains four cysts, the largest of which is about $2\frac{1}{2}$ cm. in diameter. The right ovary contains two cysts, the largest of which is about 2 cm. in diameter. Cultures from the surface of the uterine mucosa were sterile. *Bacillus coli communior* was obtained from the deeper layers.

Histological examination: The mucosa of the uterine body varies in thickness from 0.3 to 0.8 mm. and is covered by an epithelium averaging about 16 microns in height. The sub-epithelial cellular zone is not distinct and the entire stroma is more densely fibrous than normal. The ratio of glands to interglandular tissue is apparently normal. A few of the more deeply seated glands show atrophic epithelium and there are others that show some degenerative changes of the epithelium with small round cell infiltration of the gland luminae. The mucosa of the left horn varies in thickness from 0.5 to $1\frac{1}{4}$ mm. and is covered by an epithelium 12 to 16 microns high. The uterine wall varies from 2 to 10 mm. in thickness. Fibrosis of the stroma is more or less general but varies in extent in different portions. At places it is slight, in others it is marked and has resulted in atrophic thinning of the mucosa. The condition of the uterine glands also varies. In some places they are apparently normal, in others there are degenerative changes of the glandular epithelium with small round cell infiltration, and in still others there are glands with atrophic epithelium. The mucosa of the right horn varies in thickness from 0.8 to 2 mm. The glandular changes are similar to those of the left horn. There is a more or less general fibrosis of the stroma but not to the extent seen in the left horn.

CASE 26

Case 26 was a Guernsey cow about 8 years old. As a heifer she was bred several times before conceiving, and calved normally in the spring of 1914. Her second calf was aborted at about 4 months in the fall of 1914. She calved normally again in the fall of 1915 and has been bred irregularly since then with failure to conceive; at least abortion has not been observed. The cow was slaughtered March 23, 1919.

Macroscopic examination: There is a yellowish muco-purulent exudate in the vagina and external os. In the floor of the vagina there is a multilocular cyst 5 cm. long, $1\frac{1}{2}$ cm. wide, by 6 mm.

high. Externally there is no enlargement of the uterus. The external os is closed; the cervical canal is 9 cm. in length. The transverse folds of the mucosa are congested and there is some hypertrophy of the left lateral portion of the second fold. The body of the uterus is 4 cm. in length. There is about 30 c. c. of a sero-purulent exudate in the uterine cavity. The mucosa of the body is not uniform in color. Upon closer examination areas are seen in which there are small, irregularly shaped, grayish colored foci varying in size from that of a pin point to 1 mm. in diameter. The mucosa of the left horn is more uniform in color, except at its posterior end, where the appearance is similar to that of the body. The color of the mucosa is a lighter gray than is normally seen in a cow that has calved. The cotyledons vary in size from 3 to 6 mm. and are of a grayish yellow color. Both oviducts are apparently normal. The left ovary is $4\frac{1}{2}$ cm. in diameter and contains a cyst-like structure $1\frac{1}{2}$ cm. in diameter. The right ovary is 4 cm. in diameter. *Bacillus coli communior* was obtained from the exudate in the uterine cavity. Cultures from the deeper layers were negative.

Histological examination: The epithelium of the cervical mucosa is not uniform in appearance. In places it is normal, in others the cells are swollen and many of them have lost their nuclei. Desquamation is observed in places. Many of the sub-epithelial capillaries are filled with blood and small sub-epithelial hemorrhages are seen in places. Local areas of edema are also observed. In places there are marked collections of cells under the epithelium. Here endothelial cells and lymphocytes predominate, although there are a few polymorphonuclears and erythrocytes observed.

The mucosa of the uterine body varies from 1 to 3 mm. in thickness and is covered by an epithelium 16 to 30 microns in height. Numerous leucocytes are seen in the process of passing through the epithelium. In places the epithelial cells are cloudy and the nuclei very faintly stained. The sub-epithelial cellular zone is not sharply differentiated, but blends gradually with the deeper portion of the stroma. There is a marked leucocytic infiltration of the sub-epithelial zone. There are numerous collections of the leucocytes into groups, explaining the appearance seen in the macroscopic examination. The interglandular tissue is thickened, but partakes more of the nature of adult connective tissue. Only in places is there evidence of active proliferation. The glandular changes are marked. Many of the glands are apparently normal, but many

others show marked degenerative and disintegrative changes of the epithelium with round cell infiltration of the gland luminæ.

SUMMARY

Of the eleven cases presented here, all except Nos. 996 and 17 were clinically sterile. No. 996 was slaughtered because of a peri-uterine abscess, and No. 17 was slaughtered because of aborting some seven weeks before. The anatomical alterations of the uterine mucosa vary in the different animals from slight fibrous thickening of the transverse cervical folds with no apparent alterations of the corporal and cornual mucosæ (Case 18) to an atrophic endometritis (Cases 23 and 25). The lesions observed in varying degrees in the different cases are mucoid degeneration of the superficial epithelium, local and diffuse fibrosis of the uterine mucosæ, leucocytic infiltration of the stroma and gland luminæ and degeneration and disintegration of the glandular epithelium with diminution in the number of glands. In the majority of cases the anatomical alterations are comparatively few and it is hardly conceivable that failure to breed was the result of loss of functional tissue of the uterine mucosæ. Of course it is not known to what extent the uterine mucosa may be anatomically altered and yet remain functional, but it may be logically assumed that considerable alterations are necessary to render the uterus permanently sterile. Surely some fibrosis of the mucosæ with some loss of uterine glands should not render the uterus functionally inactive. This is not nature's way. Theoretically, before arriving at a conclusion (and conclusions can not be drawn until more data are available), we must distinguish between the sequelæ of an active condition and the effects of a condition still active. Judging from alterations of other functional organs, considerable of the former are compatible with functional activity. This thought suggests two problems of research that are vital to the solution of the cause of sterility, viz.: The alterations of the secretions and their effect on the male and female sexual cells, because of an active morbid condition of the uterine mucosæ, and second, the effects of such a condition on the cyclic functional activity of the ovary. The difficulty of obtaining suitable material for this kind of investigation is a great obstacle in the way of valuable research, but the importance of this problem impels us to overcome this difficulty.

Dr. E. H. Riley has resigned his position as livestock extension specialist at the Montana College of Agriculture to engage in general farming and stock raising near Hammond, Minn.

DISEASES OF THE BULL INTERFERING WITH REPRODUCTION

By W. W. WILLIAMS, Springfield, Mass.

THE role played by diseases of the bull upon the reproductive problem has generally been overlooked or at least much underestimated. Some investigations have been made along these lines, but they have been so restricted to certain phases of the subject that the value of the findings in relation to the question as a whole is problematical. Impotence, sterility, and the production of weak offspring from a given sire are very common.

For the maintenance of efficient reproduction the diseases of the bull demand thorough study. Their relation to disease and reproduction difficulties of the cow may sometimes be quite obscure, but nevertheless they have an important bearing on the subject. Since several bulls in the same herd may become simultaneously infertile, the fact that the cow has had services to more than one bull does not suffice to prove that she is sterile.

Disease interfering with reproduction may be classified as to cause under several different heads. Feeding and care of the mature bull, aside from the sexual hygiene, seem usually to have no immediate relation to true infertility, although it is to be expected that the general debility following continued improper care may definitely lower the vitality of the germinal cells or even alter their morphological characteristics.

Insemination may be seriously hampered by physically defective coitus or by psychic impediments to coitus. The difficulty may be caused by deformity of the limbs or feet, sore feet, overloading of the rumen with coarse, non-nutritious foods, obesity, fear of falling, paralysis, etc. Obesity in show animals is particularly detrimental, as they usually have insufficient exercise.

Penial tumors, usually of the epithelioma type, may grow to such dimensions as to interfere mechanically with coitus. Immobilization of the penis may result from tubercular adhesions in the region of the peri-penial lymph glands or adhesions caused by the imprudent use of irritating disinfectants in the sheath.

Granular balanoposthitis occurs very frequently, especially in older animals, and the coincident tenderness of the prepuce and glans penis may interfere seriously with coitus. In some cases it may cause the cessation of coitus, but not so frequently that it should

be classified as an important cause of sterility. In 40 bulls examined by me, distinct balanitis occurred in 9 cases. The severest cases were accompanied by other changes which were more significant.

The health of the accessory glands is of great importance because of the part they play in the manufacture of the seminal fluid, to certain elements of which the spermatozoön owes its virility. In the bull there are three sets of accessory glands—the prostate, Cowper's glands (bulbo-urethral), and the seminal vesicles. The prostate and Cowper's glands are not readily defined clinically, as they are covered by the musculature which surrounds the urethra. Their function is not so clear as that of the vesiculæ seminales, although it is very probable that their secretions are inimical to reproduction. Clinical data concerning them are absent. The seminal vesicles secrete most of the seminal fluid. These glands are usually very readily palpated per rectum. Seminal vesiculitis, or spermatozystitis, in varying degrees of intensity is common. Fifty-five per cent of the infertile and impotent bulls which I have so far examined show symptoms of spermatozystitis. On palpation it may be recognized by evident pain or by enlargement, induration, abscessation, or a cystic condition of the gland. The tenderness is usually more marked on the anterior side near its base. As the inflammatory process progresses the gland increases in size and becomes firmer and the lobules more accentuated. Not infrequently one gland becomes several times the size of its mate. If the excretory duct be occluded the gland becomes cystic or abscessed.

The normal variation in size and consistency of the seminal vesicles is so great that some experience is required to differentiate the normal from the abnormal. The glands of the young bull are often quite small, not more than 2 inches long by $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter, and they are quite soft and pliable. With increased age and function there is constant enlargement, so that the bull at 10 years may possess glands measuring as much as 4 inches in length with an average diameter of about $1\frac{1}{2}$ inches. In the seminal vesicles, which act as reservoirs for the seminal fluid, the spermatozoa collect, swimming free in their contents, and await ejaculation. The amount of seminal fluid stored in the older bull is normally somewhat greater than in the younger animal. The fluid may occasionally be palpated per rectum in apparently normal animals. This should not be confused with a cystic condition of the gland.

Chronic spermatozystitis is apparently quite common. There is

bloops

usually a proliferation of the connective tissue, probably accompanied by excoriation of the epithelial cells. Any inflammatory process of the gland tends markedly to lower the fertility of the animal. In one case, where there was considerable induration of the gland, the inflammation had apparently subsided and the breeding sufficiency of the bull remained unimpaired. Apparently a slight spermatocystitis may interfere seriously with fertility, but an enlargement of the vesiculæ seminales in the absence of active inflammation is not necessarily detrimental, providing the volume of the seminal fluid is not greatly lessened or its character altered.

Disease of the epididymis is not uncommon. An inflammatory process may readily cause a closure of the finely coiled tubule, immediately bringing about total sterility. The epididymes lie principally upon the medial side of the testicle, the head above and the tail below, the latter being continued by the vas deferens which turns upward anteriorly, parallel to the body of the epididymis. The head invests the superior extremity of the testicle. The body is small. Inferiorly, it terminates in the tail which is closely attached to the inferior extremity of the testicle, forming a hemispherical mass approximately $1\frac{3}{4}$ inches in diameter. Epididymitis is indicated by swelling, by the parts being poorly defined, or by abnormal consistency. Usually, I believe, other disease in the genital organs may be expected in conjunction with epididymitis.

The physical and chemical character of the seminal fluid varies greatly according to the condition of the glandular structures. From a very large seminal vesicle the quantity of the secretion may be much increased, but that this increase is in any way injurious to the spermatozoa in the absence of a definite seminal vesiculitis is improbable. The normal ejaculation of semen varies in amount between 6 and 15 mils. In some apparently healthy animals only 2 or 3 mils of very viscid semen may be excreted, but if a second ejaculation follows immediately a discharge of 10 mils or more of normal semen may result. The first coitus in these cases is apt to be without results. A diminution in the quantity of the ejaculation occurs when the seminal vesicle becomes indurated or its excretory duct occluded. In the young bull the glands may be underdeveloped and a hypo-function result. A lessened secretion in the older animal is usually accompanied by an increased viscosity of the seminal fluid.

The color and opacity of the seminal fluid vary widely. Even in normal samples the differences are very marked. It may be whitish

or straw-colored, of the consistency and appearance of thick pus, or quite translucent. The normal sample contains a whitish sediment, or flocculi, which occupies about one-half to two-thirds its volume. In some cases a coagulum occurs soon after ejaculation. This is usually associated with a definite diminution in the numbers and vitality of the germinal cells, but the reason for the coagulation is not clear.

Most sterility is due to diseases affecting the germinal cells. The condition is usually referable to pathological processes existing in the testicle, but the vitality of the spermatozoön is probably also readily influenced by the character of the secretion of the accessory glands or declining constitutional vitality of the bull. Even in the absence of perceptible orchitis, disturbances of the testicular germinal epithelium and of the spermatozoa occur with great frequency. In most cases they are largely trophic, all parts of the cell developing but the nucleus remaining atrophic. This lessening in size of the nuclear elements results in a great variety of differently shaped heads. In some the nucleus is represented by a bar not much greater in diameter than the connecting piece. In others there is a gradual tapering off to a point. In still others, cells may be seen in which the tapering, beginning at the nuclear membrane, is abrupt. In the latter, the longitudinal measurement of the cell is much lessened, resulting in an almost hemispherical mass. Few abnormal cells are motile, and a large number are ejaculated minus their tails.

The final result of the process of spermatogenesis is the production of mature spermatozoa which become loosened from the germinative cells and lie free in the seminiferous tubules. Under certain conditions, as in an inflammatory process of the testicles, spermatogenesis is interrupted. An exfoliation of the primitive germinal cells occurs, and spermatids, spermatocytes and spermatogonia may be present in the ejaculated semen. These germinative cells resemble epithelial plates, but their nuclei occupy a much larger proportion of the cell than do those of the squamous or transitional epithelia. Various stages of the mitosis may be distinguishable.

During the later stages of spermatogenesis the nucleus occupies the portion of the cell facing the periphery of the seminiferous tubule, and the cytoplasm the more centrally located portion of the cell. The tail, connecting piece and neck now form, protruding from the cytoplasmic portion of the cell. The cytoplasm undergoes a transition. Part of it probably acts as nutriment to the maturing

cell; the rest is gradually transposed to the anterior aspect of the nucleus.

An arrest in development may occur at any stage, but the type usually observed is that in which the cytoplasm in the body region has undergone incomplete absorption. This may be recognized as a slight enlargement in the connecting piece, or, if the absorption is less complete, as a tuberosity nearly as large as the head. Then the nucleus comprises the entire head part, the chromatin material remains somewhat organized, and the neck granule is usually very distinct. The spermatozoön which has been arrested in development is non-motile and otherwise unfitted for fecundation. The connecting piece and tail usually remain firmly attached.

The occurrence of tailless spermatozoa is quite common. The condition is usually accompanied by further morphological changes in the nuclear portion of the head. Where there is any great cellular disintegration, clumps of tails matted together may be distinguished scattered throughout the sample.

A diminution in the number of excreted spermatozoa is termed oligospermia. If no cells are eliminated, the condition is termed azoöspemia. This may result either from a disturbance of the germinal epithelium or from an occlusion of an excretory passage. If the inflammatory process occurs during fetal life or soon thereafter, the testicle may remain very small, flabby and imperfectly developed. No spermatozoa are produced. Later in life the testicle is subject to a variety of inflammatory processes. It may undergo abscessation, but perhaps the occurrence of a desquamative inflammation or trophic disturbances in the seminiferous tubules is commoner. The spermatogenetic process is then materially decreased or stopped and many of the cells may be eliminated in an imperfect state of development. The testicle, instead of increasing in size as in abscessation, atrophies slightly and loses its typical testicular tone. This process is very chronic and occurs without any evidence of heat or pain.

Epithelial débris from various parts of the genital tract may be present in the seminal fluid when taken from the vagina of the cow. The differentiation of types and the determination of their source is often difficult. They may arise from any location in the urogenital tract, as the urethra, bladder, ureters, vasa deferentia, vagina, epididymes or seminiferous tubules.

Although the emission of blood in the seminal fluid undoubtedly occurs, I have not as yet observed it. Its presence is apparently

injurious to the spermatozoa. Occasionally a small amount of vaginal hemorrhage results when the semen sample is taken. Under the microscope the spermatozoa may be seen entangled in the fine fibrin meshwork. When a great deal of blood is present, little motility is observed. Especially with heifers at the time of coitus, slight hemorrhage is quite common, and probably this is occasionally responsible for the temporary sterility of such animals.

The causes of sterility, such as physical or psychic impediments to coitus, diseases of the testicles, epididymes or accessory organs, and miscellaneous influences lowering the vitality of the spermatozoa, are more or less interrelated and dependent to a certain degree upon such influences as improper diet and exercise. But diet and exercise, except in so far as they may lower the constitutional vigor or cause a predisposition to disease which results in a lessened vitality of the spermatozoa, can not be held accountable for any great part of the lowered production. The cause in most cases is the pathologic changes occurring in the essential genital organs, which are evidenced only by an alteration in the character of the seminal fluid and the spermatozoa contained therein. The efficiency of the bull usually varies in proportion, dependent upon the extent of these changes.

Of course all non-motile or dead cells are functionless, but cases of sterility in which all cells are dead when ejaculated are not common. Usually only partial sterility exists. In my series of 40 examinations, only one case excreted 100 per cent dead cells, although 20 of them have given more or less clinical evidence of sterility and impotence. It may be estimated that a normal ejaculation contains at least 50,000 spermatozoa. Theoretically only one cell is required for fecundation. Thousands die where one survives. Clinically it is interesting to note that, when even a small per cent of the spermatozoa are destroyed—say $\frac{1}{2}$ to 1 per cent—the chances for that one to survive are materially lessened. The breeding efficiency is lowered out of all proportion to the changes observed in the semen.

I believe that the process or agent which causes death and disintegration of only a few cells may so devitalize the remaining spermatozoa as to render them incapable of fusing with the ovum. It is not common for all cells to suffer to the same degree.

In general, infertility, as to cause, falls into two main groups: (1) That due to extrinsic factors, such as impediments to coitus, overfeeding, etc., and (2) those changes which lower the vitality or

impede the migration of the spermatozoa. In the first case the fundamental cause is usually readily ascertained and the difficulty may be corrected. If any serious impediment exists it is usually apparent enough that the animal may be sent to the butcher. Changes in the semen and spermatozoa, however, demand a closer study, as they have an intrinsic influence upon the reproductive problem. When the vitality of the germinal cells is appreciably lessened a viable offspring is not produced. This is evidenced clinically by an increased sterility and abortion rate. (See accompanying table.)

Breeding Statistics of B-4, January 5, 1920.

Items	1916		1917		1918		1919		Total
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
Copulations..	10	....	67	.....	69	....	106	....	251
Cows bred...	10	....	36	.....	40	....	38	....	63
Conceptions..	8	80	32	88.9	26	65	9	21	75
Abortions...	2	25	7	21.95	7	27	5	55.5	21
Not conceiving current year.....	2	25	4	11.1	14	35	30	79	

Clinical manifestations of disease, 24 cows, or 36.5% per cent of total cows served.

Out of 9 cows conceiving in 1919, 1 calved normally and organs remained normal; 3 calved normally but had diseased organs, have not bred since or have been delayed in breeding; 5 aborted and have given more or less difficulty in breeding since.

Thus out of a total of 40 examinations recently made, I have recorded changes in the semen of 23, or 57.5 per cent, of which 18, or 78.3 per cent, evidenced an increased sterility or abortion rate or both. Twenty bulls, where the herd history showed increased sterility and abortion in the cows served by these bulls, were examined; in 18, or 90 per cent, changes in the seminal fluid of spermatozoa were noted. Fifteen out of 23 abnormal samples taken from 40 individuals contained spermatozoa with morphological changes. The clinical significance of these changes depends to a great extent upon their character. The most important of this group are the 10, or 66.2-3 per cent, of the cases having an abnormal development of the nucleus. Of these 10 cases, 90 per cent show an increased sterility rate and 50 per cent an increased abortion rate.

Sterility of this character is probably due to trophic disturbances

✓ in the later stages of spermatogenesis. It is very tenacious because an abnormal morphology of the spermatozoa, once established, is not readily influenced by extrinsic factors or drugs. Most of the abnormal cells are non-motile, but the lessened vitality is not confined to such cells. The infertility is much greater than the percentage of diseased cells observed would indicate. Several bulls exhibiting changes in the spermatozoa have been examined frequently for a period of about 9 months, and although their care and usage have been altered and improved, no perceptible improvement has occurred in the condition of the spermatozoa. It is interesting to note that, in 6 out of 8 cases where an evident increase in the abortion rate was seen in the cows served, an abnormal type of head was common.

If these observations are representative, it would appear that abortions in some cases are the result primarily of a lessened vitality of the germinal cells and not due directly to the infection present. That the changes may originally be the result of an infection is quite probable, but when we compare the abortion rate of this group with that of other groups which give greater clinical manifestations of active infection of the essential organs, we find in the latter a higher sterility rate. It is not clear to what extent infections are directly responsible for the arrest in development of spermatozoa.

Recently I have observed, in specimens from four bulls, cells which had appendages of cytoplasm to the anterior portion of the body. In one case cells of a more primitive type were present. In three out of four cases the fertility was perceptibly lessened. With the other case no accurate history was obtained, but from all that I could ascertain the breeding efficiency had not been impaired.

✓ The occurrence of tailless spermatozoa indicates a loss in vitality of all cells present. The condition is apparently the result of trophic disturbances in the later stages of spermatogenesis, though it is possible that the elements from the accessory glands may to a limited degree bring about similar results. In the latter case, however, one would not expect marked morphological changes in the nuclear portion of the head. Tailless spermatozoa are usually coincident with a head of the constricted nucleus type. Where this occurs, the breeding efficiency is poor. Recently I have observed in one sample about 20 per cent of heads without tails, having no further morphological changes. The motility of the remaining cells was good, and no ill effects up to the present time have been observed from the use of the bull in the herd. However, free heads

should be regarded as an indication of decreased vitality of the spermatozoa, and, as in samples where there are abnormal forms, the rest of the cells of the particular sample may be expected to share the effects of the devitalizing agent, whatever it may be.

Total azoöspemia does not often occur. It is difficult in most cases to decide whether the proper number of cells are eliminated, but when the difference is very marked an estimation is possible. In one case where I estimated that the cells did not exceed about 50 per cent of their normal number the seminal fluid was straw colored and but very slightly turbid. In another case where there was a total azoöspemia the seminal fluid was of a watery consistency and entirely translucent. I do not know the origin of the seminal fluid in the latter instance, but it is doubtful if any of it originated in the seminal vesicles, as these were both badly diseased.

Although nature deems it necessary to produce such great numbers of spermatozoa that one may survive for fusion with the egg, it is hardly probable that such quantities are at all necessary, were it not for the possibility that the percentage of cells capable of fusing with the egg may be below normal. An apparent slight diminution in the number of cells excreted is of little significance, providing all are normal and of high vitality. If the reduction in the number of cells is apparent or other indications of a serious disturbance occur in the semen or genital organs, the condition should be viewed with concern.

In some cases the ejaculation is very scant and the mucus extremely viscid. Upon placing a small drop under the microscope it will be seen that there is no active locomotion. The cells may be seen clumped together in a very viscid mucus which serves to impede locomotion, although the cell is alive and apparently normal. The semen does not mix readily with the vaginal mucus and the spermatozoa remain more or less imprisoned. This, of course, interferes considerably with the fertility of the bull.

The question naturally arises as to what part infection plays in the production of infertility or impotence in the bull. Since an infection may or may not be clinically apparent, it is practically impossible to answer this question. Some of the changes, such as spermato cystitis, epididymitis and orchitis, are very definitely due to a bacterial infection. These different inflammations are closely related in many cases with changes in the spermatozoa or seminal fluid. The spermatozoa and semen may, however, be abnormal in the absence of any indication of a previous or present inflammation

of any of the organs. Especially is this true when there is a narrowing of the nuclear portion of the head, in which cases only 40 per cent of the animals which I have examined gave any clinical indication of an inflammation ever being present. We have attempted in many cases to ascertain the bacterial content, and to this end have had samples examined from about 30 bulls. A variety of organisms has been found, the most constant of which is a short chained streptococcus. We have no evidence in any of them of any etiological relation with the *Bacillus abortus* of Bang.

One bull was slaughtered on account of an extremely high abortion and sterility rate. The organs exhibited clinically no pathological evidence of disease. The spermatozoa were less motile than normal, although most of them were active to a limited degree and practically normal as to morphology. Inoculations from various parts, including the testicles, epididymes, vasa deferentia and seminal vesicles, proved sterile. I believe that in this case, as with several others that exhibited no marked clinical lesions but in which there were slight changes in the spermatozoa, the difficulty was entirely referable to the weakened vitality of the germinal cells and not to an infection. Of course at some remote period in the animal's life orchitis may have been present, but of this we have no evidence, and I feel justified in stating that this animal transmitted no infection to the cows he served, although out of 62 cows served by him 53.2 per cent did not conceive, and 31 per cent of those conceiving aborted.

It may be noted in some herds that the estrual cycle of almost all the cows becomes suddenly disturbed. Instead of coming at 21 days after service, estrum runs over two or three days or as many weeks. When this has continued for some time, the cattle breeder has very little or no idea what percentage of his herd is pregnant. The cessation of estrum ceases to be any indication of pregnancy. Examination of the cows will reveal few or no clinical lesions responsible for this phenomenon. This has been particularly the case in herds which I shall designate as A, B and C. In herd A, in which two bulls were used, I am informed that, up to about eight months ago, it was exceptional that estrual periods should be irregular. Since then almost all cows served by these two bulls have become irregular. In herd B, about one year ago, cows served by one bull began to abort in considerable numbers. Many animals would not conceive and their estrual periods were generally abnormal, especially just after they were bred and did not conceive. The

bull was removed from service, and the number of cows which now skip a heat after service and are not pregnant is well within the limit of error in the observation of the herdsman. In fact, an abnormal heat rarely occurs. The cows have generally conceived promptly from services by other bulls. Two or three have not, but estrum occurs at regular intervals in these animals. In herd C, in which three diseased bulls were used, improvement of the general breeding condition followed immediately upon cessation of their use.

In all these cases there was an abnormal type of spermatozoa which probably resulted in the formation of a weak embryo, unable to survive more than a week to three or four weeks. Abortion then followed unobserved and the cow again came in heat. As all cells of a given specimen are not of the same degree of vitality, the vitality of the embryo is dependent to a great extent upon the law of chance.

Very little is known of the extent of disease in the genital organs of the bull. Almost all practitioners have seen diseased bulls in which certain symptoms are very evident, but the detection of the less evident, those changes which are often of the greatest importance, has been neglected. Buck, Creed and Ladson report the results of the agglutination test for *Bacillus abortus* upon the blood samples of 325 mature bulls. Of this number they report an infection of the organs in 5 cases (1.54 per cent) and describe lesions in 2 cases which appear quite sufficient to render a bull infertile.

In contrast to this, out of my series of 40 cases, 20, or 50 per cent, showed lessened fertility, and other animals aside from these showed minor changes in the genital organs or semen. Several animals, in which the fertility was quite definitely lowered, showed very slight pathological changes; a few which showed very marked pathological conditions were functionally sound. My cases are all purebred bulls, most of them leading large herds. The percentage of diseased animals revealed is perhaps somewhat above the average, owing to especial attention being given to the clinically inefficient. However, the number of bulls in a given herd, unfit for service, may be very great. Thus, in one herd, 4 out of 6 were infertile; in another 2 out of 5, and in still another 2 out of 2, the latter being in a small herd where the bulls were used but little.

Infertility in the young bull is not uncommon. Over 50 per cent of the bulls with lessened fertility which I have examined have been under 6 years of age.

From the limited amount of work done upon the male, any definite conclusions now as to the extent of disease and its significance can not well be made, but I feel quite justified in stating that disease of the male reproductive organs is quite equal in importance to that of the female. Insemination with weak or dead spermatozoa may quickly be followed by a catastrophe to the herd. To the cow an abortion may be considered a serious handicap, no matter what its cause may be. If infection causes no permanent disability of the organs, the mere wasting of the breeding time by itself constitutes a serious economic loss. I believe that it is the duty of every practitioner who is working with diseases of the genital organs to consider carefully in each case the male as the source of the difficulty, and make certain that he is sound. Any veterinarian not possessing the knowledge on this point may expect to make serious errors in diagnosis. It has been the custom in the past to hold the cow accountable for all diseases of the genital organs, and I dare say this view has been responsible for many a good animal going quite uselessly to the shambles. The mere ability to copulate and the ejaculation of apparently normal semen by any bull is no proof of his reproductive ability.

CONCLUSIONS

1. The clinical examination of the sexual organs of the bull and of his semen is of vital importance and should be carried out by one who is equipped for the purpose.
2. Examination is best made with the aid of a high-power lens with the fresh specimen, and an oil-immersion lens with the stained preparation. The efficiency of the semen depends not only upon its physical properties but upon the number of spermatozoa which are motile, the degree of motility, degree of oligospermia, and the percentage of imperfect spermatozoa, either deformed or immature.
3. When fecundation is the result of the union of germinal cells of lessened vitality, abortion may result in the absence of any specific infection.

EXAMINATION OF SEMEN

The samples of semen for examination is best taken directly from the cow's vagina, which, just prior to service, should be freed as thoroughly as possible from vaginal mucus so that the semen is not too greatly diluted. Place the semen in the sterile vial and examine under the microscope within 30 to 45 minutes, in the mean time keeping the sample at about 102° F.

After noting the quantity and the physical characteristics of the

semen, a small drop is placed upon a warm microscope slide and covered with a thin cover-glass. It is immediately examined under a high-power lens and observations made to determine the relative abundance of cells, degree of motility, and number and character of dead cells.

The finer morphological details are best determined with a stained preparation. For this a smear from a fresh sample of semen is made upon a microscope slide and dried quickly by waving in the air. It is then fixed by heat. Staining for bacteria and spermatozoa require different methods. If for bacteria, the fixed film without any further treatment is stained with any of the common bacterial stains. When it is desired to stain the spermatozoa, the fixed film should be treated with a $\frac{1}{2}$ per cent chlorazene solution for about 7 minutes to remove the mucus, which otherwise clouds the field. Rinse with tap water and then either dry the film or wash with 95 per cent alcohol. It is now ready to stain.

For proper examination of stained preparations it is necessary that the cells should take the stain deeply and the constituent parts show in clear detail. Such is not readily accomplished with the common aniline stains excepting with the most painstaking technique. The most satisfactory stain which I have used is a triple stain made up as follows:

Stain No. 1

Alcohol	1 part
Carbol fuchsin	2 parts
Alcoholic eosin	1 part
Filter until no precipitate occurs.	

Stain No. 2

Loeffler's methylene blue.....	1 part
Distilled water.....	1 part

Stain the smear for 2 minutes with solution No. 1, changing the stain over the film continually, to prevent its precipitation. Solution No. 1 is very unstable; a precipitate occurs either if it is exposed to the air too long or if it comes into contact with the slightest moisture. Rinse the smear under a gentle stream of water and counterstain for 3 seconds with solution No. 2. Examine under the microscope and ascertain the quality of the stain. If the counterstain with methylene blue is insufficient, stain again for 2 or 3 seconds. If the eosin-carbol fuchsin stain is not properly applied and a precipitate occurs, remove the stain with 95 per cent alcohol and restain. Dry smear in air and cover with thin cover-glass if to be retained as a permanent preparation. Examine under an oil-immersion lens. Spermatozoa stain a purplish color by this method, and bacteria are usually not stained so as to be seen.

Abnormal findings in either the fresh or stained preparations should be checked with subsequent samples, but normal findings may be considered as conclusive evidence of health.

SURGERY OF THE UDDER IN DAIRY COWS¹

By R. L. WEST, *Waseca, Minn.*

THE subject as assigned to me is "Surgery of the Udder in Dairy Cows," but I intend to confine my remarks to affections of the teats and their surgical treatment. I am not posing as an authority on this subject. Surgery of the teat in dairy cows has always been considerable of a bugbear to me. I have had more than my share of it to do. If I can start a discussion of the problem, which may not be so much of a problem to the older practitioners, my object will have been attained.

The difficulties of surgery in this region are no doubt recognized by all, but to sum them up: First, in the large majority of cases we are called upon to do this work on cows giving milk; in fact, most commonly on those which have just freshened. Hence we have the milk flow to contend with, making healing by first intention difficult, due to contamination of the wound by milk, mechanical interference with the wound during the process of milking, and making it impracticable in most cases to remove the patient to the hospital, making it necessary to leave the after care in the hands of the layman with all that that implies. Second, the ease with which the udder may become infected by the insertion of foreign matter through the teat duct, unless unusual care is exercised; and third, the practical impossibility of maintaining dairy cows in slings, making it difficult to guard against post-operative infection when the animal lies down.

To offset these disadvantages, we have a few factors that make for ease and success in operating in this field. First, the accessibility of the parts, under proper restraint; second, the parts being hairless, making preoperative disinfection and cleansing easy; and third, the fact that this is one of the few places on the animal body where dressings can be secured successfully by means of adhesive tape.

We have three general classes of surgical diseases of the teats to contend with; i. e., traumatism, fistulæ of the teat duct, and obstructions of the teat duct.

TRAUMATIC WOUNDS

Traumatic wounds are not usually of much consequence unless the lactiferous duct is involved, but in the rare cases of this kind to

¹ Presented at the twenty-third annual meeting of the Minnesota State Veterinary Medical Association, St. Paul, Minn., January, 1920.

which we are called every effort should be made to obtain healing by first intention. The client has doubtless wrestled for weeks in the past with cows with torn teats, and when he finds a serious-looking cut entirely healed in a few days his satisfaction is something wonderful to behold. And after all, satisfaction on the part of the client is the best fee that a veterinarian can obtain. Of course where the teat is badly lacerated or contused, or both, healing by first intention is impossible, and the client's mind should be prepared for a long period of gymnastic exhibitions at milking time.

In case the milk duct is involved—and we are not often called unless it is—even greater care should be used to obtain primary union. In the first place, always cast the animal. I hog-tie all four legs, even in pregnant animals, and tie the tail out of the way. I do not believe that there is any method of restraint by which proper work can be done in these cases with the animal standing. There is practically no danger of any bad effects from casting, even in cows in an advanced stage of pregnancy, although it is of course always well to prepare the owner's mind for such a contingency.

If the wound is of more than an hour's standing I remove the entire surface of the wound with a very sharp scalpel. Hemorrhage usually ceases spontaneously in a few minutes, but if not it should be thoroughly checked. I then cleanse the wound very thoroughly with mild antiseptics. If possible to obtain boiled water, I use physiologic saline solution only. The wound is then painted lightly with tincture of iodine and sutured. I consider it very important to insert a row of buried sutures of fine medium hard chromic gut. For this purpose I use a small No. 20 full-curved needle and needle holders. These sutures are interrupted, and are placed rather deeply through the muscle tissue, as close to the milk duct as possible, but not through the mucous membrane of the duct. The skin may then be united with either a continuous suture of fine silk or by adhesive tape. The latter I consider preferable.

A self-retaining milk tube is then inserted in the duct; and here let me say that in all cases where a milk tube must be left in a teat for any length of time I always use one with openings throughout the entire length of the tube, the lowest being just above the self-retaining enlargement. This tube should be left in place for six or seven days, only removing it for a few minutes once daily to cleanse and sterilize it by boiling. This, in my opinion, is very important, for if the tube is removed for any length of time the milk which accumulates in the teat will surely work into the wound

and prevent its healing properly, usually resulting in a milk fistula. In instructing the client as to the after care, too much emphasis can not be placed upon the proper cleansing of the milk tube when removing and replacing it. If this handling of the tube by the layman could be eliminated it is certain in my mind that a much higher percentage of complete recoveries would result; but I have not found it practicable in the ordinary case to visit the patient daily for this purpose. The client invariably thinks that you are trying to pad his account, just driving out to wash that little tube and replace it, which he thinks that he could just as well do himself; yet I will wager that there is not one layman in ten who, in spite of all cautioning, will resterilize the tube in case it should touch the cow's foot, or even be accidentally kicked from his hand onto the nice clean bedding, while he is trying to insert it in the teat.

FISTULA OF THE TEAT DUCT

Milk fistulae of the teat may be congenital but are more often the result of improper healing of traumatic or operative wounds. Their treatment should, if possible, be delayed until the end of the lactation period. If the opening is small it may sometimes be closed by cauterizing the opening slightly by means of the actual cautery; but I believe that an operation consisting of removing a piece of tissue including the opening of the fistula, and suturing, is more certain in its results and hence more satisfactory. I first insert a milk tube or probe into the milk duct through the natural opening, making an elliptical incision, including the opening of the fistula, down through all the tissues to the milk duct, wait for the hemorrhage to cease, remove all clotted blood and close the wound as before described in the treatment of traumatic wounds. In these cases also, even if the cow is practically dry, I insert a milk tube, as there is nearly always enough milk secreted by the quarter to interfere seriously with healing if means are not made for its ready escape through the natural teat opening. In these cases it is usually unnecessary to remove the tube for cleansing so often, and when the udder is not secreting so profusely it seems to be more resistant to infection for some reason. At any rate we seldom see an infected quarter from operating when the cow is practically dry.

OBSTRUCTIONS OF THE TEAT DUCT

Obstructions of the teat duct, causing partial or complete interference with the milk flow, are perhaps the most serious and difficult conditions affecting these parts that we have to treat surgically.

These obstructions may be of several kinds, viz., congenital atresia, papillomatous tumors, usually with a constricted pedicle or neck, accumulation of a varying amount of fibrous or epithelial tissue in some part of the milk duct, and true stenosis or narrowing of the lumen of the milk duct.

Congenital atresia is not usually noticed until the heifer comes in milk with her first calf. It is usually easily corrected by making an X-shaped incision over the end of the teat. I have fortunately not met with those cases described in literature where a portion of the milk duct is lacking.

Probably the most common obstructions are the tumorous growths of some kind which may occur anywhere along the course of the milk duct. They may be felt through the teat wall as more or less hard, firm bodies of varying size, and when a milk tube is introduced into the teat their point of attachment can usually be ascertained. After many attempts with various instruments I have given up trying to remove these tumors through the natural opening of the teat. After treating traumatic wounds successfully in that region I was encouraged to attempt their removal through an operative opening on the side of the teat, and I have since followed that procedure with much better success. The technique in these cases is very similar to that used in correcting teat fistulæ. The teat tube or probe is first inserted and an attempt made to locate the point of attachment of the obstruction. A rather free incision is then made clear through into the teat tube, endeavoring to cut through just to one side of the base of the tumor. The tumor is then removed with scissors or scalpel, the base of the tumor just touched with the fine point of the actual cautery (this stops the hemorrhage, and since I have been using it I seem to have less trouble with recurrence of the affection), and the parts sutured as described before and similar after care given. The important points in this operation, in my opinion, aside from the usual precautions as to asepsis, etc., are, first, the use of the actual cautery, and second, the location of the incision, close to the base of the tumor, as I believe that in this way the most complete incision of the tumor can be accomplished with the least sacrifice of the epithelial lining of the milk duct.

Those conditions in which there is a proliferation of fibrous or connective tissues in the duct are more difficult to treat, especially if a large portion of the length of the duct is involved. Use of the teat slit and dilators give temporary relief, but in my hands the relief is only temporary. Hence in cattle of ordinary value I usually

open the teat well, leave a milk tube, and advise drying of the quarter as soon as possible and disposing of the animal at the end of the lactation period. I believe that amputation of the teat in these cases is really the rational procedure, but I have not practiced it. I have tried operating in a manner similar to that used in the case of tumorous obstructions, but it seems difficult to dissect away the excessive tissue without destroying so much of the lining mucous membrane that stenosis of the duct results. However, in the case of a valuable animal, where the proliferation does not seem excessive, I believe that such an operation is indicated, as in my opinion it gives the only chance of permanent and complete recovery.

COMPLICATIONS

Complications in all these operations are similar. The one most commonly met with and the most to be feared is, of course, infection and possible loss of the quarter, which may even result in a fatal case of mammitis. This infection is practically always occasioned by the use of an infected milk tube. Milk fistulæ, if they occur following an operative opening of the duct, may be corrected at the end of the lactation period. Aside from these complications, care should be used in giving a prognosis, as recurrence of the trouble or stenosis of the duct may supervene. While polyvalent bacterins should not in any way replace every precaution in regard to asepsis, both during the operation and in the after care, still I believe that their use at the time of operation, or, in the case of traumatic wounds, when they are first treated, is of material benefit in preventing post-operative infection of the udder.

This in a general way has been my method of handling these cases. Teat troubles, especially in valuable dairy cows, are exceedingly trying to the dairyman and are often the cause of severe monetary losses; so if we can work out more satisfactory methods of handling them not only are we performing a real service, but I think that there are no fees more cheerfully paid than those for work of that kind where the actual benefit from the operation is so plainly apparent.

It is announced that the Second International Congress of Comparative Pathology will be held at Rome in the spring of 1921 under the presidency of Professor Perroncito. The first congress was held at Paris in 1912 and was attended by more than 500 physicians, veterinarians and botanists.

THE OCCURRENCE OF EPITHELIAL TUMORS IN THE DOMESTICATED ANIMALS¹

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INTRODUCTION.

THE economic importance of tumors in the domestic animals is entirely underestimated. Of the epithelial tumors the papilloma is the most common. Next comes the true epithelioma. The adenoma and the adeno-carcinoma are not so numerous.

The papillary epitheliomata occur sporadically and enzoötically. Often all the dogs in a kennel are affected, while calves in a single stall are also found affected simultaneously. This points to infection as being the possible causative agent. They occur in the mouth, esophagus, stomach, around the external genitalia, in the urinary bladder and on the skin generally. In general, papillomata are most common at the places where there is a transition of epithelium from the true skin to a modified epithelium.

Papillomata of the skin, according to Kitt, have been seen in newborn foals and calves. In addition to the congenital origin they are claimed to result from a mechanical irritation by the amniotic threads. Usually the development appears to be due to inflammatory irritation in which there seems to be a contagious material. Schindelka produced papilloma in calves by rubbing sections of warts on the lightly scarified skin. Zwick and Royere contend that warts are infectious and that they are identical in man and beast.

The places of predilection in horses and dogs are the external genitalia, the lips and the foot of the horse. The papillomata are particularly numerous on the udder of the cow. They may also occur on various parts of the body in the same animal. They also occur on the head, ears, side of the neck, shoulders, abdomen and the extremities. They were also seen by Youatt and Van Hieffelen in goats and sheep.

The mucosa of the mouth is predestined to papillomatosis. Here the papillomata seem to be due to mechanical irritation, in the horse by taking up hard fodder (König). On the other hand, an infectious

¹ Presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

agent may be the cause; for example, in dogs, where often an entire kennel is affected by papillomata of the mouth. According to Kitt, they proliferate quite often, in cattle and dogs from the gums of the lower jaw in the region where the teeth cut through. They also occur on the mucosa of the lips, gums and cheeks, as well as on the tongue and the pharyngeal mucosa. They are often seen in dogs that suffer simultaneously from a chronic catarrh, so that they appear to be infectious (Gratia).

Filiform, coraliform and pedunculated papillomata occur in the esophagus of cows. They were also observed in the omasum and reticulum. In the stomach of the horse papillomata commonly occur at the line of transition between the cardia and the pylorus. They may result from an inflammation or they may be present independently of any inflammatory irritation (Kitt). In connection with the proliferation of the squamous epithelium, the glandular tissue may also proliferate.

Adenomata of the skin arise from the sebaceous or the sweat glands. They may be a simple hypertrophy of the sudoriferous glands, as occurs in chronic eczema of the back (Siedamgrotzky). They may also be due to retention of the secretion associated with a glandular proliferation leading to cyst formation (cystadenoma). In dogs the sebaceous adenomata are common. The circumanal glands seem to be particularly predisposed to tumor formation. The sebaceous glands in the skin around the concha of the ear and the sweat glands of the external auditory apparatus are also often hypertrophied.

Carcinoma of the skin originates in the squamous epithelium, the so-called horny cancer, or epithelioma. It may also take its origin from the sudoriferous or the sebaceous glands of the skin. The carcinomata develop preferably in the places where the skin goes over from the general skin to the mucous membranes. The shoulder and the croup have also been seen as the primary seat of carcinomata (Fröhner). On account of the extreme importance of epidermoid carcinomata in domesticated animals, it was deemed best to devote a separate paper to these neoplasms.

Carcinoma of the mammary glands occurs mostly in dogs. Pütz undertook transplantation of mammary carcinomata in normal dogs. They healed in, were resorbed, and no noticeable tumor growth resulted after a year of observation. One dog developed multiple carcinoma of the lactiferous glands with metastasis in the lungs and in the ligaments and epiphyses of the left elbow joint.

Carcinomata arising from the nasal mucosa are composed of cylindrical cells. They are of rare occurrence. Eberlein described two such cases in the horse. A similar tumor primary in the mucosa of the frontal sinus was noted by Kitt. On the other hand, tumors in the maxillary sinus of the horse have been observed quite often. They develop from the epithelium of the hard palate or from embryonally misplaced epithelial islands.

Primary adeno-carcinomata of the lungs are quite rare. They arise from the mucous glands of the bronchi. More rarely their origin is in the bronchial epithelium, or in the flattened epithelium of the alveoli. They have been seen in the horse (Nocard), sheep (Schütz, Besnoit and Eber), dog and cat (Kitt).

Thyroid carcinomata occur quite often in the dog. They were also described in the horse (Pfeifer).

Adeno-carcinomata of the kidney have been observed in horses, cattle, swine and dogs. We have observed an enormous sized adeno-carcinoma of the kidney of a horse used for anatomical dissection. Papillary carcinoma rarely develops in the pelvis and ureter of the dog. On account of its embryonal situation and development, the kidney is a favorable place for mixed tumors. Johne saw a growth in the kidney of a pig which, owing to its structure, he named adeno-sarcorhabdomyoma.

In the ovary adeno-carcinoma and cystadenoma are the common tumors. Sarco-carcinomata also occur. These are known as ovario-blastomata. Uterine carcinomata are quite rare in domesticated animals. They have been seen mostly in dogs. In woman this is one of the most frequent forms of carcinoma.

Liver adenomata were described in sheep, dog, swine and cattle. An adenoma arising from bile duct epithelium was described in a horse. Hepatic carcinoma or adeno-carcinoma may be of liver cell or of bile duct epithelium. It is not so common in domestic animals as in man. It has been seen in dogs and sheep (Johne, Martin, Besnoit).

Scirrhus carcinomata of the pancreas were seen in several cases in dogs (Kitt). They have broken through into the intestine, with metastasis in the liver. A case of multiple adenoma of the pancreas has been described.

Kitt observed primary sarco-carcinoma of the peritoneum in horses. Casper described a case of primary carcinoma of the sub-lumbar and mesenteric lymph glands of a horse.

CASES

Case 1.—A portion of the esophagus of a cow that was received for diagnosis. The organ was greatly enlarged for an area of 24 cm. in length. The enlargement was due to numerous irregularly rounded growths projecting from the mucosa and practically occluding the lumen. These whitish nodules varied from 1 to 4 cm. in diameter. On section they were found to be composed of whitish connective tissue and covered by a more granular laver 1 mm. thick. This layer resembled the normal mucosa of the esophagus (fig. 1). Microscopic examination showed it to be a papilloma.

Case 2.—A 7-year-old chestnut mare, driving type, that was destroyed on account of progressive paralysis due to degeneration of

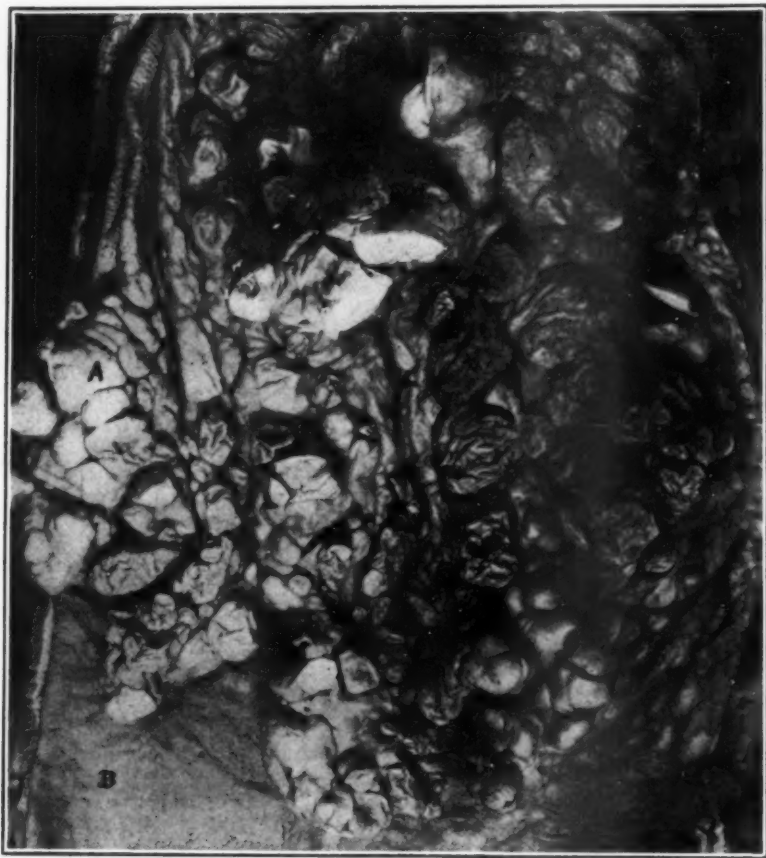


Fig. 1. Papilloma in esophagus of cow. Case 1. (Half natural size.) A, papillomatous growths. B, mucosa of dilated esophagus

the lumbo-sacral roots, and to congestive spinal meningitis. On the line that marks the transition between the cardia and the pylorus there were numerous warty elevations varying in size from 1 mm. to 2 cm. in diameter. Microscopically these were seen to be composed of vascular connective tissue arranged in the form of papillæ



Fig. 2. Papilloma in teat of cow. Case 3. (x40.) A, vascular connective tissue. B, thickened epithelial layer



Fig. 3. Papilloma from eyelid of cow. Case 4. (Natural size.) A, filiform papillomatous outgrowths. B, place where skin has been removed

and covered by a thick layer of stratified squamous epithelium. The adjacent glandular tissue also showed irregular proliferation. This is a case of multiple gastric papilloma.

Case 3.—Tumor, 3 mm. long and 1.5 mm. in diameter, removed from a teat of a cow. The teat canal was occluded. Microscopically it was composed of vascular connective tissue covered by stratified squamous epithelium. This is a papilloma of the teat (fig. 2).

Case 4.—Growth on skin around the eye on the membrana nictitans of a cow. Received from Dr. Juliard, Greene, N. Y. It involved an area of 8 cm. long and 2 cm. in its widest part. It was composed of whitish threads 2 to 6 cm. long and 0.5 to 1 mm. in diameter (fig. 3). Microscopically this was found to be a papilloma.



Fig. 4. Section of papilloma from penis of horse. Case 5. (Natural size.) A, corpus cavernosum. B, deviated urethra. C, beginning of papillomatous growth. D, connective tissue. E, epithelial tissue

Case 5.—Tumor removed from glans penis of a horse, surgical clinic. The tumor, 1 cm. long and 6.5 cm. in diameter, was granular, of a grayish color, and covered by a sticky substance. It was composed of finger-like projections varying in size from 5 mm. long and 2 mm. in diameter to 4.5 cm. long and 3 cm. in diameter. The smallest ones were next to the penis and the largest were those farthest away. There was a sharp line of demarcation between the penis and the new growth. On section these finger-like growths were of a whitish glassy appearance in the center, and surrounded by a grayish granular zone. The urethral opening deviated so that it opened on the side. On microscopic examination this tumor was found to be composed of richly vascular connective tissue arranged in the form of papillæ and covered by a heavy layer of stratified epithelium. This is a case of papillary epithelioma (fig. 4).

Case 6.—A poorly nourished 12-year-old gray pointer with black spots, spayed when about 6 months old. She began to lose flesh 5 months previously. Destroyed by ether.

Autopsy showed little subcutaneous and subperitoneal fat. The mesentery, visceral and parietal peritoneum were markedly congested. The liver was larger than normal and contained numerous grayish white nodules varying in size from 1 to 5 cm. in diameter, projecting from the surface. On section a large quantity of reddish liquid escaped. There were a few scattered nodules in the interior of the liver tissue. The parenchyma appeared hazy. The hepatic lymph glands were greatly enlarged. They were united into a mass about 8 cm. in diameter. In color this mass resembled the nodules that were found in the liver. One omental lymph gland was 1.5 by 1 by 1 cm., of a reddish color, and contained grayish white spots at one end. The spleen was enlarged and contained three hematomas, each about 1 cm. in diameter. The left thyroid was about 5 cm. in diameter. On section a quantity of pus escaped, leaving in the center a cavity about 3 cm. in diameter. The rest of the gland had a hazy appearance. The right thyroid gland was normal. The heart was dilated, particularly the left ventricle. The valves were normal. All the other organs appeared normal.

Microscopically the follicles of the typhoid were larger than normal, irregular in shape, and filled with degenerated cuboidal cells. In places there was a little colloid. In the liver the nodules were composed of cells resembling the follicular cells of the thyroid with colloid material between them. Immediately around the nodules there was a considerable amount of colloid between

the cords of liver cells. The liver cells showed cloudy swelling.

This is a case of a colloid carcinoma arising in the thyroid follicles, with metastases in the liver, the hepatic and the omental lymph glands.

Case 7.—A well-nourished aged male hound weighing 22.5 kgs. that was destroyed on account of posterior paralysis. He had a cataract on each eye, small papilloma behind the elbow joint and one on the penis.

The right thyroid gland was 10 cm. long and 5.5 cm. in diameter. The distal end was lobulated. The left thyroid was apparently normal; it measured 4 by 2 by 1 cm. On section the right thyroid was nodular, the nodules being yellowish white in color. There was a hard nodule 1 cm. in diameter involving the subcutaneous tissue in the region of the right thyroid.

The esophageal lymph glands as far down as the entrance to the thoracic cavity were swollen and nodular, the largest one being 5 by 3 by 2 m. On section these nodules were yellowish white in color and firm in consistency. In the lungs there were solid nodules 1 to 3 mm. in diameter scattered uniformly, mostly under the pleura. The pancreas was enlarged by numerous nodules 2 to 5 mm. in diameter scattered throughout. The liver contained scattered nodules 1 cm. in diameter in all the lobes. The wall of the gall bladder also contained several nodules. On section the lobules were found sparsely distributed throughout the organ, some of them being lobulated. There was a nodule 1.5 cm. in diameter in the left adrenal. The heart showed chronic dilatation of both ventricles with almost complete synechia of the pericardium.

Histologically the nodules in the thyroid were made up of large rounded cells with round nuclei occupying about one-fourth of the cell. These cells were arranged in large nests with very little supporting tissue. The metastatic nodules in the pancreas and in the other organs were surrounded by thick vascular capsules. In places these capsules were being invaded by nests and cords of cells. These cells were similar to those found in the thyroid gland.

This is a thyroid carcinoma with metastasis in the lymph glands, lungs, liver, pancreas, adrenal, and subcutaneous tissue (fig. 5).

Case 8.—A 2-year-old Holstein heifer, destroyed on account of sterility. Case of Dr. W. L. Williams. The animal was in good condition. There was a considerable amount of subcutaneous and subperitoneal fat.

The mammary glands were surrounded by edema. They were

soft and fluctuating. On section they were edematous and cystic, and a large amount of watery liquid containing a little milk oozed out.

Microscopically, the normal glandular tissue was absent. The fat was infiltrated by nests of cells arranged in tubules filled with cuboidal cells.

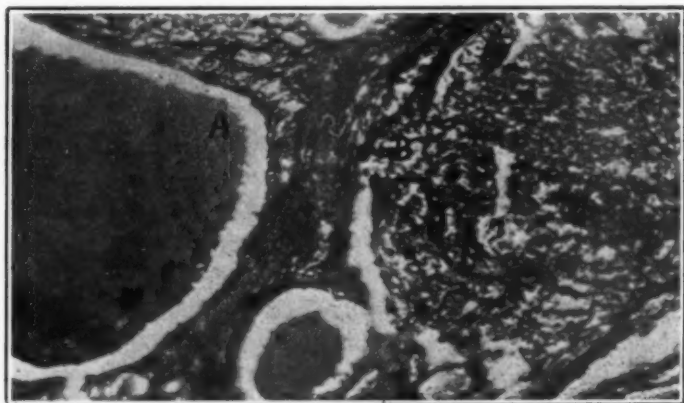


Fig. 5. Thyroid carcinoma in a dog. Case 7. ($\times 105$.) A, distended follicle filled with colloid. B, distended follicle filled with cells

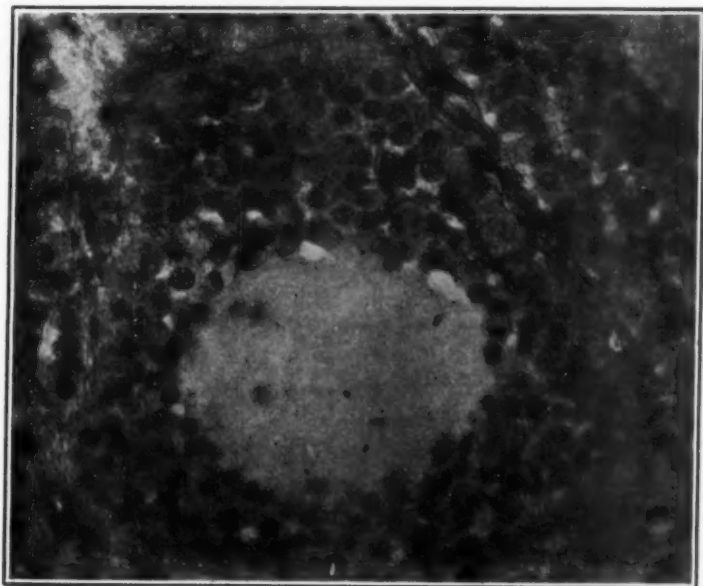


Fig. 6. Granulosa cell carcinoma in ovary of cow. Case 8. ($\times 350$.) Showing a Graafian follicle filled with granulosa cells and colloid material in the center. Adjacent to it are other similar follicles

The right ovary was enlarged to 15 by 12 by 12 cm. in the diameter. The surface was smooth excepting at one point where it seemed to have ruptured. It was adherent at this point to the omentum. This adhesion was of a brick-red color and resembled an organized clot of blood. The ovary was of a reddish color and the superficial vessels were tortuous and greatly distended with blood. The ovarian artery was also greatly distended with blood. On section there were spaces filled with a gelatinous substance and spaces filled with blood. There were also large vessels distended with blood.

Microscopically, the cortex of the right ovary was seen to be composed of follicles filled with granulosa cells and colloid material, sinuses filled with blood, engorged blood-vessels and a thick connective tissue stroma which was also infiltrated with granulosa cells (fig. 6). Toward the center there was a glandular structure with a tendency to formation of papillæ. The tubules were irregular in size and in shape. They were lined by cells ranging from cuboidal to cylindrical cells, the larger tubules being lined by the cylindrical cells.

The left ovary was 1.2 cm. long and 6 mm. in diameter, markedly hypoplastic.

The spleen was enlarged and lighter in color than normal. The capsule was covered by yellowish connective tissue growths. On section the pulp was of a yellowish brown color and the splenic corpuscles were distinctly visible. The organ bulged on section.

Microscopically, the growths on the surface were seen to be composed of connective tissue cells, a few fibroblasts and numerous blood vessels, covered by mesothelium. The splenic corpuscles were identical with lymph nodes, except that they contained the arterioles, either in the center or at the periphery, that are characteristic of splenic corpuscles. These corpuscles were lighter in the center where the number of cells was scant and darker at the periphery where the lymphocytes were compact. Around these corpuscles there were numerous polymorphonuclear leucocytes, eosinophiles and eosinophilic myelocytes packed together. The veins in this organ contained an excessive amount of polymorphonuclear leucocytes and lymphocytes.

The liver contained numerous abscesses varying in size from 2 to 5 cm. in diameter. These were composed of thick yellowish gray pus surrounded by thick capsules. The capsules were of a pinkish yellow color and varied in thickness from 3 to 5 mm.

The parietal as well as the visceral peritoneum was covered by tufts varying in length from 0.5 to 1.5 cm. and 2 to 5 mm. thick. These tufts were particularly numerous on the right side, the larger ones being near the ovary and gradually diminishing in size toward the anterior part of the body. In addition the peritoneum was thickened by tissue in the form of whitish nodules.

Microscopically, these growths were seen to be composed of fat infiltrated by tubules similar to those found in the mammary glands. The internal inguinal lymph glands were slightly swollen and congested. Microscopically, the sinuses contained in places tubules composed of cells resembling those found in the ovarian growth.

This is a case of a granulosa-cell carcinoma of the right ovary with metastasis in the peritoneum, mammary gland, and the inguinal lymph glands. No microscopic examination was made of the abscesses of the liver. While they appeared to be ordinary pyogenic lesions, it is possible that they also were metastatic foci of the neoplasm. We were presented with a set of slides from Ziegler's laboratory. Among these there are several showing a tumor in a woman similar to this one, with metastasis in the liver as well as in the peritoneum.

The spleen in this case showed evidence of formation of leucocytes, the polymorphonuclear and the eosinophilic varieties. This is indicated by the fact that the veins contained more leucocytes than the arteries, also by the Malpighian corpuscles resembling nodes of lymph glands. There was no evidence of red cell formation.

The metastatic foci in the lymph glands showed numerous granular leucocytes. According to Weill, such cells are formed in carcinoma.

Case 9.—A registered Guernsey cow about 10 years old, belonging to the Anna Dean farm, Barberton, Ohio. Case of Dr. W. L. Williams. The animal was in fair condition for her age. She was suffering from what was presumptively diagnosed as an abscess of the broad ligament, of about 6 months duration. This was removed surgically and was found to be an enlarged right ovary. The animal recovered and was apparently healthy at the time of writing, five months after the operation.

The right ovary was irregularly spherical, being 12 cm. in diameter and weighing 530 grams. The surface was smooth and shiny. At one end there was an elevation 2.5 by 2.5 by 1.5 cm.

This was apparently normal ovarian tissue containing several small cysts, each being 2 mm. in diameter, and a corpus luteum 1 cm. in diameter. On section the mass was found to be composed of yellowish gelatinous cysts interspersed by whitish granular tissue. The cysts varied in size from 2 mm. to 1 cm. in diameter. There was a capsule all around the tumor measuring from 0.5 to 4 mm. in thickness. The ovarian tissue was separated from the main mass by the connective tissue capsule excepting at one end where it was indistinguishable from it.

Microscopically the tumor was seen to be composed of follicles filled with granulosa cells and containing colloid material in the center.

This is a granulosa cell carcinoma of the ovary, similar to case 8. This one was removed apparently before metastasis had taken place. By the structure and location, such tumors do not metastasize very readily, and if removed early, recovery may be expected.

Case 10.—Tumor from neck of dog. Case of Dr. Hollingworth, Utica, N. Y. The growth was removed surgically and a piece received for diagnosis. It was a hard tumor and gritty on section. It was firmly attached to the trachea. Microscopically it was composed of cylindrical cells arranged in a glandular manner with spicules of bone scattered throughout.

This is a case of osteoid adeno-carcinoma that apparently arose from the mucous glands in the tracheal wall.

Case 11.—A guinea pig that was inoculated with suspected bovine sputum. In the usual course of time 1 c. c. of tuberculin was injected, which apparently killed the animal. Autopsy revealed nodules in the lungs, liver and spleen. Those nodules were apparently free from tubercle bacteria. Histologically the nodules in the lungs and in the liver were composed of tubules lined with bronchial epithelium. These tubules were of irregular shapes and sizes, with a small amount of connective tissue between them. The epithelium lining these tubules was of a cuboidal type resembling the lining cells of the bronchioles. The nodules in the spleen were apparently hyperplastic splenic corpuscles.

This is a case of adeno-carcinoma arising in the lining of the smaller bronchi or bronchioles with metastases in the liver (fig. 7).

Case 12.—A well-nourished adult ewe that was slaughtered on account of difficult respiration thought to be due to larvæ of *Æstrus ovis*. With the exception of the head, the animal was apparently normal.

External examination of the nostrils showed nothing abnormal. On opening the nasal cavities and the sinuses, the turbinated bones were found to be greatly enlarged, entirely occluding the right nostril and causing a slight deviation of the nasal septum (fig. 8). The mucosa of the right superior maxillary sinus was about 5 mm. thick and of a gelatinous appearance. The retropharyngeal lymph glands were slightly enlarged, otherwise they appeared normal.

Microscopically, the growth of the turbinated bones was seen to be composed of rounded cells somewhat resembling small, round-cell sarcoma. At the periphery, however, there seemed to be a



Fig. 7. Bronchial carcinoma in lung of guinea pig. Case 11. (x 65.) A, irregular sized and shaped bronchioles. B, connective tissue infiltrated by cords of tumor cells

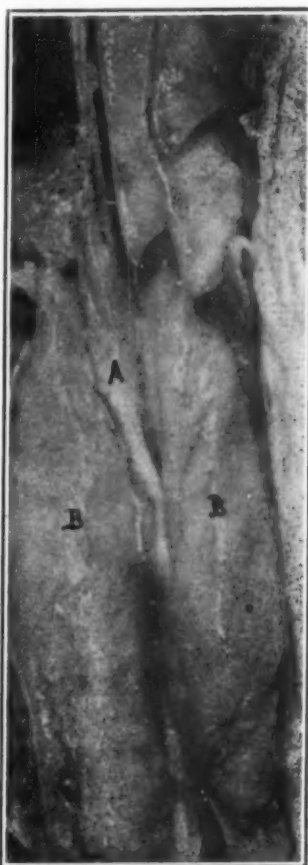


Fig. 8. Diffuse carcinoma in turbinated bones of sheep. Case 12. (Natural size.) A, nasal septum. B, thickened turbinated bones

transition from the columnar cells lining the mucous glands to those round cells. There was very little connective tissue in the growth.

Ewing has an illustration of a similar tumor in man which he calls diffuse carcinoma. He claims that such carcinomata are very often mistaken for sarcomata.

This appears to be a case of diffuse carcinoma of the turbinated bones.

Case 13.—Tumor of kidney of a horse, accession 293. The animal died with an acute hemorrhagic colitis.

The right kidney was greatly enlarged by a circumscribed encapsulated growth 22 cm. in diameter. On section, the tumor was



Fig. 9. Adenoma in kidney of horse. Case 13. (A little less than half natural size.) A, atrophied kidney tissue. B, adenomatous tumor

composed of rounded areas surrounded by a little connective tissue. The tumor was rather soft and of a grayish color. There was a considerable amount of degeneration and necrosis in the center. The kidney tissue was pushed to one side and greatly atrophied. There was a sharp line of demarcation between the kidney tissue and the new growth (fig. 9).

Microscopically the tumor was seen to be composed of various sized tubules containing numerous papillæ. The tubules were lined by a single layer of cuboidal cells. There was a small amount of connective tissue between the tubules (fig. 10).



Fig. 10. Same as B in Fig. 9. ($\times 350$.) Showing cuboidal cells forming papillary projections in a tubule

The left kidney was greatly hypertrophied.

This is a case of a papillary adenoma of the kidney.

Case 14.—A spayed, well-nourished, aged Maltese cat weighing 3 kg. She had a soft, somewhat fluctuating swelling 5 cm. in diameter in the right parotid region, from which a small amount of pus escaped on incision. Destroyed by chloroform. On section the mass was found to be lobulated and composed of soft whitish tissue with a considerable amount of degeneration and suppuration. Histologically it was composed of glandular epithelium infiltrating the tissue with a considerable amount of fibrin and polymorphonuclear leucocytes between the glandular epithelium. There was very little connective tissue stroma. The tumor was vascular, however. The cells were of the columnar type, resembling those found in the parotid gland. This is, therefore, an adeno-carcinoma originating in the parotid gland.

Summary of Cases

The first five cases are those of papilloma at the point of transition from the true skin to a modified epithelium or from one form of epithelium to another. They are in the esophagus of a cow, in the line of transition between the cardia and pylorus of the stomach of a horse, in the teat canal of a cow, on the membrana nictitans of a cow, and on the glans penis of a horse.

Cases 6 and 7 are those of thyroid carcinoma of dogs. In the former there were metastases in the lymph glands and in the liver. The latter metastasized in the lymph glands, lungs, liver, pancreas, adrenal and the subcutaneous tissue.

Cases 8 and 9 are those of granulosa-celled ovarian carcinoma of cows. The former showed early metastasis in the lymph sinuses of the internal inguinal lymph glands, in the peritoneum, in the mammary glands, and perhaps also in the liver. In the latter there was apparently no metastasis.

Case 10 is an osteoid adeno-carcinoma of the tracheal mucous glands of a dog. Case 11 is a bronchial adeno-carcinoma of a guinea pig with metastasis in the liver. Case 12 is a diffuse adeno-carcinoma of the turbinated bones of a sheep. Case 14 is that of a parotid-gland carcinoma of a cat. These four tumors are interesting as to both the origin and the structure.

Case 13 is that of a papillary adenoma of the kidney. It is a well-circumscribed tumor that by its growth produced pressure atrophy of the kidney tissue. It is composed of cuboidal cells arranged in an irregular glandular form.

The tissue reaction to tumor cells is, as a rule, encapsulation by connective tissue. In the case of malignant tumors the cells infiltrate the capsule, thus breaking down the resistance of the host. In diffuse carcinoma, as is shown in case 12, the tumor cells invade the tissues without any resistance on the part of the host.

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DR. HAVNER INJURED

Dr. H. H. Havner, specialist in animal husbandry of the Pennsylvania Extension Service, is in the hospital at Columbia, Pa., with a broken leg and other injuries sustained when the automobile in which he was riding was struck by a train at a grade crossing in York County, Pa. His companion, Mr. E. E. Owens, a junior in agriculture at Pennsylvania State College and acting as Assistant County Agent of York County, was instantly killed.

Dr. R. W. Tuck, who entertained the New Orleans convention with an address on "Federal Meat Inspection," is now on a vacation trip through France and England. He reports another outbreak of foot-and-mouth disease at Norfolk, where he is visiting his sisters. The disease is now apparently under control, the slaughtering method being used to eradicate it.

Dr. Wilbur J. Murphy of New York and Cornelius J. Hayes of Illinois, both of whom were formerly connected with the Bureau of Animal Industry, are candidates at the coming primary elections to represent their respective districts in the national Congress.

Dr. George J. Gruenewald was recently transferred from Hog Cholera Control work in Wisconsin to the B. A. I. Inspection and Quarantine service along the Canadian border, with official station at Calais, Me.

SOME NOTES ON THE COMPARATIVE STUDY OF VETERINARY MEDICINE IN FRANCE AND THE UNITED STATES¹

By L. A. MERILLAT, *Orrville, Ohio*

THE title of this paper as published in the program is "French and American Practice Compared." This title was selected by our distinguished chairman, Professor Bemis, who evidently thought my two years' sojourn in the A. E. F. qualified me for the assignment. At first the title seemed compliant enough a text to supply a wealth of material, but on second thought and in the attempt to elaborate on the subject it occurred to me that during my sojourn in France veterinary practice other than military did not actually exist, since during the war all French veterinarians were mobilized. The civil population were left with very few practitioners to administer to the ailments of the animal population. This is true of both rural and urban veterinarians. In Paris all the veterinary hospitals were closed. Even the great clinic at Alfort did not open until after the armistice. The schools of Lyons and Toulouse had been converted into hospitals for humans; that is, the dormitories were used as military hospitals. Alfort for a time was occupied by an artillery organization, and it did not function as a regular veterinary school until in the season of 1919. At the time of my departure Lyons and Toulouse had not yet opened for veterinary instruction. With these facts opposing, it is plain that I did not actually qualify as a judge of veterinary practice in France under normal conditions. There was no great opportunity to judge American and French veterinarians in their normal spheres of action.

My contact with French veterinarians was, however, a close one. There was a French veterinary officer assigned to my office to assist me while I occupied the position of Chief Veterinarian of the First Army, and for four months my connection with the Franco-American Veterinary Liaison Mission, which was composed of an equal number of French and American veterinary officers, widened my opportunity for making observations. Later I spent four months at Alfort and Paris, always in contact with men of our profession.

I have found without exception that the French veterinarian is a suave, dignified, courteous and scholarly man. His preliminary education is high, and his professional training, both scientific and

¹Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

practical, leaves little to be desired. In short, the French veterinarian is the product of a century and a half of progress among a people who possess an inborn penchant for scientific research. The snap judgment of some of our veterinary officers, generally from a limited observation, that they lack practicability, is incorrect. A closer observation would have shown them that the ability of the French veterinarian to apply his high scientific knowledge is little short of marvelous. At the risk of being called a panegyrist I would add that their lovable personalities and the high social status they occupy is enviable, viewed from the American point of view. They are original and at the same time have the good quality of being very poor imitators. They challenge everything new, almost ferociously, but are always the first to bow gracefully to the producer of proven facts. They scrutinize closely and carefully in making diagnoses, and studiously avoid making hasty conclusions, and they never make decisions before exhausting every available means of defending them. They have acquired a better general understanding of the problems of animal husbandry than we have thus far pretended to have obtained in our college training and field work, and while they are not all expert laboratory technicians, the percentage among them capable of carrying out their own pathological researches is a reflection of the high scientific status they occupy.

Veterinary education in France is national. There are three national veterinary colleges—Alfort, founded in 1765; Lyons, founded in 1761; and Toulouse, founded in 1825. The first one is located in a suburb of Paris and the others in the cities their names indicate. Aspirants for admission apply to the Minister of Agriculture and submit with the application their legal, moral and educational credentials. Admission is by competitive examinations held at different geographical centers of the country on the same day. The number of successful applicants the colleges are permitted to admit is determined by the Minister of Agriculture and is based on the civil and military needs of the nation. The applicant must be a citizen of France, between 17 and 20 years of age, and must hold the "baccalaureat" of the French educational system. (So far as it is possible to make parallel comparisons, this is equal to two years of college work in American universities.) Certificates of health, moral character and smallpox vaccination must accompany the application. Graduates of the National Agricultural College who have the baccalaureate degree are admitted without examination. Aliens are admitted by permission of the Minister of Agri-

culture under the same regulations as French citizens, but on completion of the course receive a certificate of qualification in lieu of the diploma. The competitive examination is both written and oral, and is a test of the applicant's knowledge of composition, physics, chemistry and biology, including zoölogy, botany and paleontology.

The college course is four years of ten months each, exclusive of examinations. In making comparisons of these schools with ours the most striking difference found is the qualification of the teaching staff. Each professor is a master of the subject he teaches, an authority of world-wide reputation. He is so well known to readers of books and current literature that one feels acquainted with him before the introduction. He obtains his position by gradual steps and through competitive tests. He is first a tutor, then a *chef de travaux* (assistant professor), before reaching the distinguished rank of professor. The organization of the teaching staff is unique. The school is divided into ten departments called chairs, each one directed by a professor who is supplied with an assistant professor and tutors as required. The branches of the curriculum are so divided among the ten chairs as to give each of them the same relative importance. The ten professors constitute the Council, one of them acting as Director. Each of the three schools have precisely the same organization and are supervised by the Inspector of Veterinary Schools, who is advisor of the Minister of Agriculture on matters of veterinary education.

The schedules are prepared each year by the Councils and must be approved by the Minister. When thus approved they are publicly posted in the college departments as the official work of the year. Deviation from the schedule is prohibited. Lectures not thus prescribed can not be given except on permission from the Council.

Schedule

First year.—Medical physics, medical chemistry, pharmacology, pharmacy, toxicology, medical and forage botany, anatomy (first part), histology, embryology, physiology (first part), hippo-mechanics and horse judging.

Second year.—Zoölogy, pathology of parasitic diseases, anatomy (second part), general therapeutics, materia medica, semeiology, elementary pathology and hygiene.

Third year.—Pathological anatomy, technique of autopsies, legal medicine, medical pathology (first part), surgical pathology (first part), clinics, surgical anatomy, operative surgery, shoeing, bovine, ovine, caprine, porcine and avian pathology, special operative surgery, clinics, obstetrics, general pathology and microbiology.

Fourth year.—Food inspection, inspection of establishments under veterinary control, medical pathology and clinics (second part), veterinary jurisprudence, surgical pathology (second part), bovine, ovine, porcine, caprine and avian pathology (second part), microbial diseases and sanitary police, and zoötechnics.

Schedule by Chairs

First chair.—Medical physics, 15 hours; medical and pharmaceutical chemistry, pharmacy and toxicology, 60 hours.

Second chair.—Medical and forage botany, 22 hours; medical zoölogy, pathology of parasitic diseases, 50 hours; clinical lectures, 15 hours.

Third chair.—Anatomy, first part, 30 hours; anatomy, second part, 30 hours; histology and embryology, 25 hours; teratology, 5 hours.

Fourth chair.—Physiology, first part, 15 hours; physiology, second part, 40 hours; general therapeutics and materia medica, 30 hours.

Fifth chair.—Pathological anatomy, 40 hours; legal medicine, 5 hours; food inspection and inspection of establishments under veterinary control, 30 hours.

Sixth chair.—Medical pathology, first part, 20 hours; medical pathology, second part, 20 hours; clinical lectures, 30 hours; semeiology and elementary pathology, 15 hours; veterinary jurisprudence, 15 hours.

Seventh chair.—Surgical pathology, first part, 25 hours; surgical anatomy, second part, 25 hours; clinical lectures, 30 hours.

Eighth chair.—Bovine pathology and bovine operative surgery, first part, 20 hours; bovine pathology and operative surgery, second part, 20 hours; obstetrics, 27 hours; avian pathology, 5 hours; clinical lectures, 20 hours.

Ninth chair.—General pathology and microbiology, 25 hours; microbial diseases and sanitary police, 50 hours; clinical lectures, 20 hours.

Tenth chair.—Hippo-mechanics and exterior of the horse, 15 hours; hygiene, 25 hours; zoötechnics, 55 hours.

Total hours (not including clinical lectures), 780.

The work of each professor is so arranged as to cover a definite proportion of the whole at each lecture, or lesson, as they are called. The feature of the teaching at Alfort that impressed me most is the great pains taken in preparing each lesson for presentation to the students. A lecture is not a perfunctory affair. It is a definite amount of the curriculum presented with great attention to detail and in a way to leave a profound and lasting impression on the mind. Its outlines are carefully written out on great blackboards which cover the entire front of the room, and the professor's

table is arrayed with all manner of illustrative specimens, some from the large museum and others freshly prepared and showing that a great deal of time and pains were taken in making them. These blackboard outlines and specimens are left in view of the students sometimes for several days to enable them better to complete their study and to tabulate properly their notes.

Each chair has its own buildings and equipment, including laboratories and such laboratory paraphernalia as the group of branches it covers requires. In fact, Alfort is constituted of ten separate colleges, one for each chair. They are so distinctly separated from one another that a visitor of one might remain entirely unconscious that there were nine others in the immediate surroundings, each working diligently with its own specialty.

Alfort is located adjacent to the banks of the Marne in a suburb of Paris of the same name. It is reached from Paris by tramway or by the river transports of the Seine. Its wall incloses a beautiful park embellished with flowers, magnificent trees, shrubs, walks, drives and monuments of such distinguished veterinarians as Bourgelat, Bouley, Trasbot and Nocard. It has ample stabling and profuse equipment for the general clinic, which is under the management of our distinguished colleague Professor Cadiot, whose work as a diagnostician and therapist impressed me as being almost magical. The small-animal department is not as complete as the Director desires, and a reconstruction is one of the approaching projects. The botanical garden of several acres, under the management of Professor Railliet, displays the French artistic temperament, and while excuses were made for its condition during the war, it appeared to me to be a splendid exhibition of plants of interest to the veterinarian that grow in that climate. I regretted very much afterwards that the day assigned for my official visit to the garden was not pleasant enough to enable me to gather valuable notes on its management and mode of utilization. The resources of France were so exhausted that such things which were not actually essential to the temporal welfare of the people were given scant attention. However, it reflects great credit on our colleague, Professor Vallée, an honorary member of this Association, that this feature of the college deteriorated so little.

Intra-semester examinations are given at intervals by the assistant professors after four days' notice to those who must take them. In these the student draws two questions from a prepared group and is given ten minutes for reflection and ten to answer. All

grades obtained are publicly posted. To pass to an upper class or to obtain the diploma the student must pass a final examination before the professor of each chair. The grades are submitted to the Minister of Agriculture for his personal consideration. Successful candidates are eligible to practice veterinary medicine and to compete for a commission in the veterinary service of the Army.

There are no veterinary laws in France as we know them in our several States. Anyone may practice, but the nongraduate is under such restrictions as to the particular disease he may treat and the drugs he may prescribe that the activities of the empirical practitioner are somewhat curbed. I say "somewhat" advisedly, because quackery is not unknown in France. In my travels in the rural districts I made a special effort to gather some information in this respect, and found that almost every community supported its handy horse and cattle doctor. The fact that all of the regular veterinarians were at the front may have intensified the situation and may have made it appear more grave than under normal peace-time conditions. I fear, however, from information thus obtained and that gathered by living almost a year in the home of a leading veterinarian of Paris, that the situation as regards empiricism is far from satisfactory to the practicing veterinarian, and I am also assured that the condition in Holland, Belgium, Germany and Italy is no better. In these countries empiricism and the patent-medicine industry thrive uncurbed. Judging from advertisements in the lay press and periodicals, it is legal to sell nostrums regardless of contents or of the effects claimed for them. Thus the veterinary practitioner, after having made this splendid preparation to practice, is little protected against cheap opposition. Then it appears that medical enormities and superstitions are practiced more among the European laymen than among the more intelligent American.

The one feature in which the French veterinarian differs most from us in this respect is the way he has been able to dignify his calling and separate himself from the empiric. Here we are still classed with the lowest type of charlatan, while in France everyone knows that the veterinarian and the quack belong to two entirely different categories of individuals. Here we fight the quack to rid ourselves of an undesirable companion, while in France no complaint is entered so long as the quack does not overstep his legal domain. The French practitioner looks on cheerfully as if rather satisfied to be rid of the uncanny and gruesome jobs he might be called upon to do if the quack were not in existence. This I think

explains the status of the quack situation in Continental Europe. The prices for veterinary services compare favorably with ours, and computed in the purchasing value of the money they are much higher than ours. The large veterinary hospitals maintain a horse-shoeing establishment as an adjunct. Asked the reason for this departure, a leading practitioner of Paris who had just reopened his establishment after it had been closed for four years said: "There is some profit in the enterprise, and it brings a beaten horse-path to the door." I have since wondered if this would not be a profitable departure for our city practitioners.

Then the large Army of France affords openings for many veterinarians. The rank is from second lieutenant (*aide major de deuxième classe*) to brigadier general (*vétérinaire inspecteur*). They receive the commission through the Mounted Service School of Saumur (*l'Ecole d'Application de Cavalerie*), entrance to which is by competitive examination to fill vacancies. The examination is a rigid one, including a search into the applicants' military aptitude. The course is two years, one with a mounted organization and one at the school. There is a rigid final examination leading to the commission, and those who fail must complete their military service in the usual way with the regiment to which they were originally assigned. It must be remembered that all physically fit citizens of France spend 28 years in the compulsory military service—three in the Active Army, eleven in the Reserves, seven in the Territorial Army, and seven in the Reserves of the Territorial Army. All able-bodied men are called at the age of 20. Veterinary students after answering the call may return to their studies and complete their service after graduation with grades above a private. This gives the veterinarian the opportunity of completing his service under better conditions than a layman. They receive non-commission grades from corporal to sergeant-major (*adjudant*), and after two years' service may apply for a commission in the Reserve Army, with rank as second lieutenant. Graduates and three-year students by meeting prescribed requirements obtain the grade of sergeant-major and retain that grade while passing through active, reserve and territorial periods of their military service. These are called auxiliary veterinarians.

The French have therefore three classes of veterinary officer in times of peace—auxiliary veterinarians, reserve officers, and the active officers. The latter are analogous to our veterinary officers of the Regular Army; the others are subject to call only when

needed. If a veterinarian arbitrarily chose to take his military service as a layman and not profit by the path of promotion open to him he would rank as a private if called into service of the Reserves or Territorials. At the beginning of the late war this very thing happened to some distinguished men, who, feeling assured with the long peace that reigned in France, failed to take advantage of this provision.

The French veterinary service, like that of England and the United States, underwent great changes in regulations during the late war. This war brought out in all countries (Germany possibly excepted) that the prevailing veterinary services of armies in general are not adequate to meet the needs of a devastating war. Their services as reorganized functioned well and proved a great economy to the nation. From the veterinarians' own standpoint it was not as satisfactory as the English service, but it functioned to the particular conditions existing. The French veterinary officer does not command men. The enlisted personnel belongs to the cavalry and is commanded by a cavalry officer. But he works under a wealth of detailed regulations that give him almost unlimited power in all questions of horse management. He communicates through veterinary channels to the Chief Veterinarian. Our service at this time, as I understand the reorganization, lacks this essential feature. We are no better off today than in 1917 except in the matter of rank, and if we were called to the field a few years hence our shortcomings would be just as great as they were at the opening of the late war.

The veterinary service of the French Army, like that of ours, is not satisfactory to the veterinarians of France, and the whole profession continues to struggle for better conditions. The veterinary military history of France as taught in the curriculum of the Mounted Service Schools at Saumur relates the campaigns for improvement of the service from 1772 to the present day. This history shows that there has been a constant struggle for improvement since the French Revolution. The efforts of the A. V. M. A. are therefore not unique. Troubles of the veterinarian to obtain a satisfactory status are world-wide.

Although I made no special effort to investigate the whole general plan of meat inspection in vogue in France, the inspection that I witnessed in both military and civil centers did not impress me favorably. It seemed to lack refinement, although the inspectors I met at work were well qualified to do better work. The work was

indifferently performed, much as if it were of no great importance. In small establishments I visited it was the custom to slaughter the animals and hang the carcasses some hours before the inspector arrived. The organs were heaped in a corner unmarked, and in two separate instances I heard sharp disputes between the inspector and the butcher as to what particular carcass a given set of internal organs belonged. This of course is no criterion, and is related as much in jest as to contrast it with our splendid Federal system that operates under such rigid regulations. Meat in France is eaten fresh and therefore calls for little refrigeration. The French people detest refrigerated meat, and when none other is obtainable many prefer meatless meals. On this account it hangs about entirely too long for unrefrigerated meat. In short, there seems much room for improvement in the actual handling of meat in the big markets. The small or retail markets are inviting enough, but the large ones do not seem to accord with the culinary system of France.

There is no gradation of milk nor any existing system of milk and dairy inspection designed to protect the consumer. Milk is handled in open vessels, and no regulations as to temperature, bacterial content or systematic tuberculization are enforced if they exist at all. The civil population are entirely indifferent to this situation, and those who comprehend the need of reforms seem to be handicapped by some naïve and hidden influence that prevents the initiation of remedial measures. In milk inspection in our large cities we lead the European, and I believe that the American public, indifferent enough, is as a whole wider awake and more discriminating in this connection. In fact, some of the leading veterinarians take but little stock in the transmissibility of tuberculosis from animals to man through the medium of milk consumed. Among these is our good friend Professor Cadiot of Alfort, who in a recent contribution gave it as his opinion that the danger is approximately nil, despite the admission that the disease is prevalent enough among the bovine population.

Another unique feature of French veterinary practice is mushroom inspection. It is the district veterinarian who selects the edible from the poisonous varieties found on the market, and to prepare for this work the inspection of mushrooms is included in the college curriculum. The work is of considerable importance, since both edible and nonedible varieties grow in great profusion in certain parts of France and constitute an important article of

diet. I had occasion to attend a lecture on the subject by the eminent parasitologist and botanist, Professor Railliet, and learned in this brief hour that the selection of edible varieties is no fool-proof undertaking. It requires lots of instruction and experience to become proficient.

In conclusion I should apologize for attempting to make contrasts between individuals, between professions, between nations, involving their merits and demerits. Where it pleases in one place such a task ruffles in another and is bound in the end to leave the author without much credit. I can not, however, in justice to all concerned, close this brief paper without paying tribute to my French and American colleagues in the military service. They rendered a noble and efficient service to their respective countries. In almost all instances they accepted a grade far below their civil status and served through the whole war, and until the governments relieved them, without complaint, faithfully and persistently performing their duties against obstacles that only military veterinarians will ever comprehend, and then returned to their civil duties with a zest that shows the fiber of the members of our profession.

"An unusually successful method of combating contagious animal diseases is suggested by the plan which has been worked out in Haakon County, South Dakota, during the past year. Blackleg, hemorrhagic septicemia, and anthrax were the important diseases combated by organization, proper disposal of carcasses, and vaccination. Fourteen animal-disease committeemen, appointed as deputy health officers, were instructed to make the campaign largely educational and to use authority only as a last resort. Considering the whole experiment, the results were satisfactory."—*The Farmer*.

William W. Cutler, who recently sold his interest in Noyes Bros. & Cutler, Inc., will accept a similar position with the Beebe Laboratories, Inc., in which he has just acquired an interest. The Beebe Laboratories, Inc., under the direction of Dr. Ward L. Beebe, maintain an analytical laboratory and manufacture a line of vaccines and serums. By his entrance into the Beebe Laboratories, Mr. Cutler continues the connection with the medical supply business which his family has successfully maintained for three generations.

ANESTHETICS IN VETERINARY OPERATIONS¹

By R. R. DYKSTRA, *Manhattan, Kans.*

IN 1846 Jackson and Morton demonstrated publicly the practical use of ether, though it had been used in 1842 for this purpose, but without any publicity being given to it. As early as 1798 Davy advised the use of nitrous oxide as an anesthetic. Previous to the dates mentioned, human surgical operations were performed without the aid of anesthetics, and medical literature records that patients were carried struggling and screaming to the operating room, where fortunately nature soon stepped in, the patient becoming unconscious from the frightful ordeal to which he was subjected. During this day and age even the very minor human operations are performed with the aid of anesthetics.

In veterinary surgical operations we have not yet advanced to the same stage of humaneness in the treatment of our patients. The writer is loath to believe that this is due to a greater inherent cruelty in the veterinarian than in his human confrere, but rather to the greater difficulty in the application of anesthetics under the conditions under which the veterinarian is many times forced to operate, and also that institutions of veterinary education have not in times past attached sufficient importance to this very essential part of the curriculum. In the writer's mind there is no question but that many veterinarians do not realize the unfavorable, or in some instances almost repulsive, impression made on the owner of a pet or valuable animal by the barbaric cruelty of surgery without anesthesia. Most owners of animals are inclined to be rather practical minded, but many of them have informed the writer that they would rather destroy their animals outright than to have them "butchered alive." Nor must we forget the impression, probably only a fleeting one, made on our tortured patient.

Outside of the difficulties in application, no matter from what other angle viewed, there is no excuse for performing veterinary operations without adequate anesthesia. With this thought in mind an attempt has been made during the last few years in the veterinary clinic of the Kansas State Agricultural College to develop a form of anesthesia reasonably safe, easy of application, practical in character so as to meet the requirements of the average country practitioner, and fulfilling the dictates of a humane profession. The

¹Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920

attempt was not entered upon as a fixed project, nor was it completed, but sufficient progress has been made to warrant a tentative report.

LOCAL ANESTHESIA

It was found that practically all minor and many major operations may be successfully performed under local anesthesia. The important point was to distribute the anesthetic used in such a manner as to have the operative area thoroughly infiltrated with the anesthetizing material, and at the same time use a minimum amount of anesthetic so as to avoid the general toxic effects of the agent used.

Cocaine hydrochloride in solution was the preparation employed. Perfect anesthesia could be obtained in nerve blocking for dental operations and in diagnosing lameness, in performing otherwise painful foot operations, and in dividing comparatively large sensory nerve trunks, by the injection of 1 to 2 drams of a 1 per cent water solution of the drug. In those surgical conditions in which nerve blocking could not be resorted to, and which demanded the removal of a comparatively large amount of pathological tissue, a $\frac{1}{4}$ per cent water solution of cocaine hydrochloride was in most cases found very satisfactory. Many fistulous withers may be operated upon with but little discomfort to the patient if the field is anesthetized by infiltrating it with 4 ounces of a $\frac{1}{4}$ per cent water solution of cocaine hydrochloride. This practically means 5 grains of the drug. This amount was not exceeded, and produced no ill effects in the average sized animal other than slight excitation. The same amount and strength solution was also successfully used in removing actinomycotic tumors in cattle.

Occasionally a horse or a cow is met with that either does not respond to very weak solutions or is hypersensitive, as the pain was not controlled as perfectly as desired. In such an instance from 6 to 8 drams of chloral hydrate dissolved in 16 ounces of normal salt solution may be given intravenously to an average-sized horse.

At a later date it was found that dissolving the cocaine in a normal salt solution enhances its anesthetic action.

The excitation produced by cocaine in horses was found to be a hindrance in the diagnosis of lameness, as it was believed that the disappearance of the lameness was due to the excitement rather than the anesthetization of the painful area. This may be successfully overcome by localizing the action of the drug by the addition of a small amount of adrenalin chloride.

As a local anesthetic no other drug than cocaine was used. Stovaine and novocaine could not be obtained during this period. It is believed that they would be of still greater service in some instances because greater amounts may be used, stovaine being only one-half as toxic and novocaine five time less toxic than cocaine.

GENERAL ANESTHESIA IN HORSES

Of the volatile anesthetics, chloroform gave the best results in our hands, especially when administered by a skilled anesthetist. For the average veterinary practitioner without skilled assistance, in our opinion it falls far short of being an ideal agent, and not suitable for use under usual farm conditions.

Fluid extract of *Cannabis indica* was not found to fulfil the requirements. It was administered intravenously. It does not produce complete anesthesia, though as much as 1 ounce was administered. In most animals, if given in large enough dosage, it causes incoördination of movement and appears to make some vicious horses easier to handle. In a few instances it caused delirium so that the animal became dangerous for the attendants. At no time did we observe prolonged bad after-effects such as thrombosis in distant vessels. We have used this agent intravenously in doses of 2 to 4 drams with good results in colicky affections where the pain was so intense that there was danger of the animal injuring itself. We believe it of special value in these cases, as in our experience it did not perceptibly reduce peristaltic action.

Chloral hydrate was used in various ways. Two ounces of the crystals dissolved in $\frac{1}{2}$ gallon of water administered per rectum has a quieting effect and produces incoördination of movement, but does not produce the degree of anesthesia essential for extensive operations. The same may be said for the oral administration of the drug.

The intraperitoneal use of a solution of chloral hydrate was tried in a very limited way only. It was felt that there was too much difficulty in a country practice in obtaining that degree of sterility in the solution demanded for an intraperitoneal injection. In instances the point of the needle used for injecting purposes becomes accidentally contaminated by penetrating the intestines, and upon its withdrawal deposits the contaminating material along its course, so that there is grave danger of an abscess developing in the abdominal wall.

Intravenously, in proper dilution, chloral hydrate has in our hands come closer to meeting our demands of a reasonably safe, easily applied, practical, general anesthetic for horses than any other agent. It has been our custom to prepare the patient by a subcutaneous injection of $\frac{1}{2}$ grain of atropine sulphate, which partially paralyzes the inhibitory nerve of the heart, thus in a measure discounting the depressing action of chloral on that organ. It is contended that some horses are very susceptible to chloral, and that others have a heart weakness which might be deleteriously affected by the chloral. We therefore have made it a practice to follow the suggestion of Savage to have ready for immediate use a 20 per cent solution of camphor in olive oil and to administer this subcutaneously in a dose of 1 ounce. According to Savage, Marfori has shown that the mammalian heart poisoned by chloral hydrate to such an extent that it has almost ceased to beat will revive under the action of camphor.

It has been our custom to dissolve 2 ounces of chloral in 1 quart of a normal salt solution; occasionally tap water was used with apparently good results. No dietary or other preparation of the patient is necessary. All or part of this is injected with proper precaution into the jugular, with the animal in lateral recumbency or in a standing position if preferred. Its passage into either the peri-venous tissues or the wall of the vein should be avoided, and also the entrance of air into the circulation. The danger of sloughing of tissues or abscess formation following such an accident as that first mentioned should not be underestimated, though in our experience it has never occurred. Savage claims that he has permitted a few drams of a 2 to 3 per cent solution of chloral hydrate to escape into the peri-venous tissue without bad after effects.

We have always been very careful to administer the chloral solution slowly, and, if undesirable effects are observed, to discontinue its administration immediately. If complete narcosis is desired, the 2 ounces of chloral dissolved in a quart of water may be safely given to a 1,200-pound horse. If the anesthesia is not deep enough, a few inhalations of chloroform will bring about the desired degree of unconsciousness. Unfavorable symptoms such as cyanotic mucous membranes, sweating, muscular trembling, very slow respiration and circulatory disturbances are treated by the use of camphorated oil, or strychnine sulphate, or both subcutaneously. These latter agents also hasten recovery. We have found it desirable, in order to avoid a tedious waiting for recovery when the animal is

on the operating table and has returned to consciousness, to place slings on the subject in the recumbent position, then turn up the table so that the patient is suspended in the slings, where more perfect recovery takes place in from 1 to 2 hours.

DOGS

The use of chloral hydrate also is followed by satisfactory anesthesia in dogs. Two drams dissolved in 2 ounces of cold water administered per rectum will anesthetize the average-sized dog in less than 10 minutes. If it does not, an additional dose is recommended. In a few cases, in order to obtain quicker results, we have used double the above-mentioned dose, and as soon as the animal is unconscious the excess or unabsorbed solution is withdrawn from the rectum with a 2-ounce bulb syringe having an 8-inch hard rubber nozzle. It is our experience that the drug causes less rectal irritation when dissolved in cold rather than warmed water.

SWINE

These animals are apparently not so readily affected by the rectal administration of a solution of chloral hydrate. We have administered per rectum as much as 3 drams of chloral in solution for every 50 pounds in weight, and then been compelled to complete the narcosis with inhalations of ether. We nevertheless prefer to anesthetize swine in this manner.

SUMMARY

1. Cocaine hydrochloride dissolved to the extent of $\frac{1}{4}$ per cent in a normal salt solution will anesthetize all tissues infiltrated with it.
2. Chloral hydrate in proper dosage dissolved in a normal salt solution and administered intravenously is a safe, satisfactory, practical, general anesthetic for horses.
3. Chloral hydrate in proper dosage dissolved in cold water and administered per rectum is a safe, satisfactory and practical anesthetic for dogs.
4. Chloral hydrate in proper dosage in solution in cold water is a fairly satisfactory general anesthetic for swine.

DISCUSSION

DR. GRUBER: How much per pound weight of chloral would you give in anesthetizing dogs?

DR. DYKSTRA: Two grains to about 5 pounds, per rectum.

DR. T. E. FOSTER: May I ask the Doctor what was the dose of chloral, per rectum, for hogs?

DR. DYKSTRA: We have used as much as 3 drams per 50 pounds of weight. I believe that could be exceeded, but I have never used more.

DR. GANNETT: Do you use anything other than ether on cats, with success?

DR. PATTERSON: I would like to ask the Doctor if he uses chloral in preference to the A. C. E. mixture in dogs.

DR. DYKSTRA: I have never used the A. C. E. mixture. Personally, I would prefer chloral. However, I think it is a little more practical. The A. C. E. mixture must be given by insufflation. The chief advantage of chloral is that it gives the man a chance to work with the dog alone for five or ten minutes. I was trying to make the paper practical for the average practitioner where he was all alone and had no assistants.

I have never used chloral for cats. I have always used ether. I have been afraid of anesthetizing cats.

DR. G. A. KAY: I would like to ask if you have had any difficulty in poisoning of cats, cats dying from giving ether alone. What are the results of the operation?

DR. DYKSTRA: We have had them die from ether, but we have always been very careful to give it slowly, and when we think anything is going wrong we stop immediately.

DR. KAY: I mean after-effects, not on the operating table. We have had some die with that.

DR. CARPENTER: I would like to ask Dr. Dykstra if he has ever had any trouble in getting the chloral into the rectum of the dog. Can you keep the chloral in the rectum?

DR. DYKSTRA: We have had some trouble. We had better results when we used cold water, rather than warm. We all know that chloral hydrate is very irritating, and it was my idea that the warm water increased irritation and the cold water rather reduced it, but the trouble has not been extensive.

DR. GANNETT: I have used various anesthetics on quite a number of dogs, and have found morphine to be very efficient.

NECROLOGY

On August 30, 1920, Frederick W. Ainsworth, inspector-in-charge, Lancaster, Pa., died of a complication of diseases. He was born at Pecatonica, Ill., March 16, 1862, and graduated from the veterinary department of Iowa Agricultural College. He entered the B. A. I. on February 7, 1898, and was in continuous service of the Government until his death.

"Hog cholera is as prevalent in China as it was in the United States before vaccination became available. In the delta region of Canton about 40 per cent of the spring crop of pigs die each year or are marketed because of this disease."—*Wallaces' Farmer*.

THE TREATMENT OF CRYPTORCHIDISM¹

By E. E. WEGNER

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Washington, Pullman, Wash.*

EXPERIENCE teaches us that many otherwise useful and valuable animals are quite unsuitable for working purposes because of the retention of one or both testicles. Their dispositions are so very unreliable that many are a liability instead of an asset. They are never trusty, and most of them are ready to take advantage of the first opportunity to start trouble in the team or in the field. Many of them can not be permitted to run at large with the other animals, and I have seen some that would attack a man in the open field. They are generally much more excitable than the average entire male, and are not nearly so reliable.

In the very young animals this condition is seldom noticed, and it only comes to the attention of the owner when the animals are assembled for castration at the age of yearlings or two-year-olds. At this time it is the operator who makes the discovery that one or both testicles are retained. If castrated at one year of age it often happens that the organs are located with difficulty and may not be encountered by a casual examination. Therefore exhaustive examination in both the standing and recumbent positions should be made before the animal is classed as a monorchid.

Failing to locate the organ, one may take the normal one and allow the animal to be released, or he may allow the animal to go entire. It seems to make no difference in the future conduct of the retained one. If the normal testis is removed, one should make a careful record of the side from which the organ is removed, for future reference, as otherwise only a scar remains to tell the history of the former operation; and though this is quite reliable, a written record is better. The animal should be examined at intervals of six months to ascertain whether the normal descent has been made.

If the testicle has not descended at the age of two years the chances of its descending at all are very remote and operation for its removal may be recommended at once.

Animals over two years of age are frequently presented for operation, and some as old as ten years. This is really no handicap,

¹Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

as the older animals appear to suffer from the operation no more than the younger ones. In fact, they are frequently easier than the young ones, as the tissues are firmer and have a slighter tendency to tear. The animal's resistance at the greater age is noticeable, and unless an extreme age has been reached the patients are very desirable.

Animals are frequently presented for treatment that have never been observed by the operator. In this case, if they have attained the age of two years, operation is advised. It is surprising how often the testicles are palpated in the inguinal region of animals that are regarded by the owners as ridglings, and I consider the thorough examination of the canals very desirable, unless you wish to class all such cases as monorchids for financial reasons.

I have found that when the testicles are retained in the inguinal canals a very large percentage of them can be palpated, and the small percentage remaining are held exceedingly high. This applies to the average two-year-old that is not in high flesh, or any other animal that is in average working condition, and provided that the canals are normal. The spermatic cord that may be doubled and occupy the canal may also be palpated at times, though it is not always possible to tell for certain what it is. I would recommend, however, if one is not sure that he feels the testicle, that he make all preparation for a complete operation. In the absence of testicle or spermatic cord the canal has a distinct emptiness that is quite characteristic and differs considerably from the canal containing a doubled cord or a stump left after a previously successful operation.

My personal experience with about 150 such abdominal operations prompts me to say that the preparation of the animal is of very great importance. Simply withholding the coarse feeds, hay and roughage for a period of 30 hours is all that is required. The animal may have his water and grain, so that he suffers very little from hunger. This simple dieting is very essential, however, and should be insisted upon. One is frequently urged to operate as soon as the animal is brought in, so that the owner can witness the operation, as he usually expects to do. A reply that it is difficult for the operator and dangerous to the patient is usually sufficient to handle the situation. At times when these cases are met in the country, miles from a hospital and no previous notice of the cases, the temptation is very great to attempt operation in spite of one's better judgment, and I suppose under some circumstances one is justified in operating; but if the abdomen is full and the case difficult, one

may easily be sorry that he made the attempt. If he has no trouble he should charge it to good luck. With the full abdomen the bowels have a very decided tendency to pass out into the canal and remain there to annoy the operator, and especially when the animal strains, if it has not been completely anesthetized. In extreme cases it may be impossible to replace the bowels and keep them there; so I say, do not let this happen. It can be easily prevented.

After the animal has been properly prepared, the instruments, consisting of scalpel, scissors, emasculator and chain *écraseur*, are sterilized by boiling. Other instruments are occasionally necessary, but in the vast majority of cases those mentioned above are sufficient. If the operation is to be performed in the country the instruments may be boiled and wrapped in a sterile towel to be used when needed.

The animal is cast in the dorsal lateral position on the ground or mats, and tied with the straight pelvic tie, which flexes the hocks and holds the hind legs wide apart, exposing the inguinal regions in perfect manner for operation. The side to be operated is to be uppermost, and after the operation is started an assistant may hold the upper hock to advantage, pulling it outward to open the inguinal region still more.

The hocks and feet are covered with damp towels to prevent the contamination of the operative area. The entire region inside the thigh, the posterior part of the abdomen and the sheath are thoroughly cleansed as required. If clean and hairless, tincture of iodine alone is used in liberal quantities. If dirty and long-haired, thorough washing with a lysol solution and clipping followed by drying and tincture of iodine is the best method. The hands are washed well in antiseptic solution, and if necessary to aid with the casting, canvass gloves are worn to prevent contamination. When these are slipped off only a small amount of time is required to complete the sterilization. Lysol is my preference of a hand antiseptic, as it aids in lubricating the hands and this greatly facilitates progress of the operation.

I carefully examine both sides for scars of previous operations, as this gives very valuable evidence concerning a previous operation and frequently disputes a positive owner. If both sides have been opened previously, and two scars are found, then the scar evidence is of no value, and the selection of the side to be operated is made from the information received by palpation.

In the absence of any suggestion of preference, the left side is operated first, as about 65 per cent of monorchids have retained testicles on the left side. If the wrong canal is opened, the stump of the spermatic cord is encountered in the canal and the error is discovered before the operation has proceeded to a serious state, and the other canal is then made the object of operation. The object of the operation is to follow up the canal through which the testicles should normally descend.

The normal inguinal canal is easily followed after making an incision through the skin about 2 inches from the median line and parallel to it. The tissues of the canal can be thrust aside by using the fingers only. The error is sometimes made of missing the external ring and going outward under the skin of the flank. This may easily be prevented by a little care in making the advance, and is usually the result of nervousness. Occasionally one encounters an abnormal canal where the external ring is not well defined and is filled with a considerable amount of fibrous tissue. In such cases one may easily go wrong if extreme care is not taken in making the advance, and one must be guided by general anatomical knowledge to arrive at the inner ring.

When operation is attempted after a previous unsuccessful attempt, the difficulty is sometimes very great, as the canal is frequently filled with dense fibrous tissue which resists all attempts to separate it by blunt dissection. At times it is necessary practically to cut your way the entire distance through the canal, which is very difficult and annoying.

Once in the inguinal canal of the proper side, careful search should be made for any protrusion of the tunica vaginalis, and if such is found it is to be ruptured and the contents, usually the spermatic cord doubled, brought farther down and traction on the distal end applied, to bring the testicle up to the inner ring, which may then be enlarged by gently tearing it with the fingers so that the testicle may be drawn out. The opening thus made is only large enough to permit the testicle to pass, and the danger of prolapse is very remote.

If nothing is encountered in the canal, advance is made to the location of the inner inguinal ring, marked by a decided thinning of the abdominal wall at that point. The peritoneum here may be slightly loose and folded, and one may, by grasping the loose fold, palpate the spermatic cord just within. In these cases it is only necessary to break through and draw out the testicle. If the cord

can not be felt, a break is made in the thinnest part of the wall as high up in the canal as practicable and the fingers withdrawn and the tips placed in a circle around the opening. Then gentle movement inward and outward may cause the cord to pass out into the hand. If this fails, the forefinger is introduced and search is made about the region just inside. If this is not successful, two fingers are introduced and a wider search made, especially backward toward the pelvis. This two-finger search is practically the limit necessary to find the organ, or rather to find the epididymis or vas deferens, which can be drawn out and the testis will follow. Regardless of the fact that a great deal is made of the fact that the testicles are sometimes found against the diaphragm and in other remote places in the abdominal cavities, it still remains true that practically 100 per cent are at or very near the region of the inner ring only waiting for an opportunity to escape when someone kindly opens the gate.

Nor is it usually necessary to institute a prolonged search. A little patient, careful exploration is usually sufficient to locate the epididymis or the vas deferens. These may be recognized by the touch, especially the epididymis, which has a very characteristic feel. Structures of the cord also show a very natural willingness to pass out through the artificial opening, after that has been made, and frequently flow out without traction as soon as the fingers are pushed through the peritoneum, if this opening has been made at the natural point of exit.

One may ask, "How about the cases where the testis is not near the inguinal ring?" In most such cases it is the operator and not the testis that is abnormally located, though I admit that such cases do exist. If this occurs, the entire hand is introduced into the abdominal cavity and slowly thrust backward toward the pelvis, searching all the while for the desired organ. If it is not encountered, the vas deferens can easily be located near the bladder and brought down to the opening and the testis drawn out in that manner. Even in these cases the danger of prolapse is not as great as might be supposed, and the same precautions against prolapse may well be taken. The fact remains that even this opening made as high as possible in the inguinal canal is not likely to induce a prolapse.

After the testicle has been withdrawn and removed with emasculator or the chain *écraseur*, if the cord is short, the animal is allowed to regain his feet, and in 95 per cent of cases no packing or suturing is necessary. On this point there may be some difference of opinion,

but experience has taught me that the patients do vastly better when no pack is used and that the danger of prolapse of the bowels is much overestimated. In fact in the average case I am convinced that the pack is more dangerous than the open canal, since they soon become contaminated with pus if left any length of time. Where the opening at the inner ring is quite large I sometimes securely suture the skin of the scrotum to prevent complete prolapse if the bowel should descend. Only once, however, has this happened, and that was following operation on a case that had not been dieted and which developed a severe case of bloat after the operation. If sutures are used they should be removed after 12 to 18 hours, as there is little danger of prolapse after swelling starts, and future continuance of the sutures causes fever by preventing the escape of wound secretions. Perfect drainage is very essential to the prompt success of this operation. Many animals are removed from our hospital the day following the operation, as we recommend that they remain standing and quiet for the first 18 hours, after which they should be required to take one and one-half hours' exercise at a walk twice a day. Many of the patients that are operated in neighboring territory are never visited again, and those that are operated in the country likewise receive no post-operative treatment, and they make splendid recoveries, many of them having no greater trouble than the average normal castration.

Abnormal testicles come in for a considerable amount of discussion, but few are of any consequence as affecting the technique of the operation. Most of them are soft and small and are quite easily drawn through a small opening. In my experience I have encountered cystic testicles. The largest one when filled after operation held 16 ounces. This one was drawn up to the inner inguinal ring and the cyst punctured with a fine trocar and the fluid withdrawn, after which it was easily brought out. Another had on it an angioma oblong in shape and about 6 inches long and $2\frac{1}{2}$ inches thick. I admit that I felt some hesitation about withdrawing it, as it felt as if I were pulling the horse's liver out instead of the testicle. Examination of the cord to make sure that it was real was reassuring, and the entire mass was then drawn out. No serious consequences followed. Dermoid cysts have been encountered, but none have in any way affected the withdrawal of the testicle, nor were they discovered until after the organ had been removed.

To my knowledge only once was the testicle so large that removal through the inguinal canal was impossible. This case was operated

many years ago at the State College of Washington by Dr. Charles Frazier, now at Chicago, who removed through the side wall of the abdomen a testicle weighing 14 pounds.

In cases where both testicles are retained and the animal is to be operated, the question arises whether it is advisable to take both at once or allow the first wound to heal before removing the other. In such cases I operate the right side first, trusting that it will be easier than the left; and if that operation is attended with no unusual difficulties I feel at liberty to remove the other at the same time, operating both sides at once. While it is true that one operation is less serious than two, I do not feel that the danger is so great as to justify operating at two different times, unless the animal is very valuable.

The one difficult factor in cryptorchid operations is the fact that the operator is required to work without the aid of his sense of sight, and this is no simple handicap for many men to overcome, but it is not impossible.

I believe that the dangers and difficulties of this operation have been greatly exaggerated, and while such abdominal interference in the horse occasionally proves fatal, it does not hold the grave possibilities that some men attribute to it.

In conclusion may I say that I believe that the essentials of this operation are, first, properly dieting the patient; second, properly securing them so that the canals are accessible; thorough cleanliness; removal of the organ through as small an opening as possible; then, above all, perfect drainage and regular exercise. By such a method you will find that few will swell to any great extent; fever seldom causes any anxiety, and many have no rise of temperature at all.

I consider the simpler after-treatment the very best, and results appear to justify that opinion.

DISCUSSION

DR. BELL: The Doctor certainly read a very interesting paper. There are one or two questions I would like to ask. In the first place, opening the testicles on both sides when operating, the Doctor mentioned that he had nothing but a scar to guide him. I have found in a great many of those cases, almost all of them, by picking up the scar in one hand, you can feel the stub of the cord that has been operated on successfully, without making an incision, going down after it and discovering it later. By that means you save that incision on the horse.

He speaks about following the inguinal canal. I think that might be quite confusing to a young operator when he attempts this operation and

goes through the external inguinal ring and goes to find the inguinal canal, which, I hold, does not exist. There is a place there for a canal, but it is filled with tissue. There is no canal until the testicle descends. Consequently you must follow from the external ring to the internal ring, directly through the connective tissue, under the internal ring. You make an examination and see if part of the testicle is through the ring, as the gentleman said.

Another thing that I question somewhat—it is just a difference in opinion, perhaps—is the dieting of the patient. It has been my practice to operate when they come to my office, without any preparation; and I would almost hate to tell you the number I have operated on and the number I have lost in the past twenty years. I think there is an advantage in operating when the patient hasn't been dieted at all. In puncturing the peritoneum you puncture it with less difficulty and push it loose from its casings. You reach it naturally from the back of the inguinal ring, and I wait for the animal to make a struggle. If he does it on an expiration, I push my finger through the peritoneum. That means if he is full of food, it prevents you from tearing the peritoneum loose from that abdominal cavity.

I manipulate, as the doctor says, for leaving the intestines through. I feel that it is a good procedure to bring the finger back and rather milk over the opening. Very often it will come open.

I have had no bad results at all. I feel that I can operate in more cases where the patient has not been dieted at all. The testicle is nearer normal. Those are some of the things that I wished to bring out in the discussion.

DR. LACROIX: I, too, prefer, in handling three-year-old or mature animals, to take them immediately. This is from habit, because it has been necessary so often that I prefer to handle them that way. I would like to ask the last speaker if he handles the three-year-olds the same way.

DR. BELL: If I throw him down and find the testicle hasn't come down yet, I advise the owner to let him go and allow it to develop. I handle some Shetland ponies, and with good results. I have only had one case where I didn't have good results. In that case we had a case of tetanus.

DR. WEGNER: I would like to say in reply to the gentleman who spoke a while ago that while I realize that there is no inguinal canal, I simply outlined the method of operating with or without dieting. I have my own opinion, and every man is entitled to his own. As to going through the muscles or going through the inner ring, I prefer to go directly through it. I have not had the experience of going outside, possibly, that he has had, and he may not have the other experience that I have had. I would advise him to try it some time.

DR. ADAMS: I would like to ask some questions. First, I would like to know if there is any good reason for making sure whether there is a scar or not. I have always felt that the direct method, making the incision directly over the ring, gave better drainage and more direct access and was preferable. I know a good many operators will pull out the skin in the region and work up until they find the location of the external ring, and they have quite a bit of skin on their wrists. I think there are a number of reasons why the direct method is better.

Of course there is no canal. I always feel with the tips of my fingers, and I like to make the incision along the long axis of that, between the inner line of the thigh and the abdomen, through the skin, the subcutaneous fascia, pushing the veins away, so as not to cut them; and then when you pass in, always pass in the direction of the external ileum, keeping the hand forward around the internal inguinal canal; crowd your hand forward until your knuckles are in the ring, and sweep the fingers back. I prefer to make my incision by the Danish method, puncturing the thin abdominal muscles and the shaft of the ileum. Sweep the fingers back until the belly wall feels very thin, puncture through with the index finger, follow with the other, and then, as Dr. Bell has said, when the full inspiration is heard, a quick puncture and you go through the peritoneum. I very much prefer to have the intestines full, and very much prefer to give a general anesthetic.

I have tried both ways, and I have given up the anesthetizing of the patient and given up the dieting of the patient, for two reasons. If the wall is lax, you will often have to thrust in a great distance before you can get enough tension on that peritoneum, and you have driven that away from that abdominal wall; and sometimes if you haven't been clean you have an abscess in the sub-peritoneal fascia.

You ought not to have a prolapse in these animals that have long, full intestines, but as a rule in those that have been dieted. Then separate the two fingers. That makes the vacuum, and something fills that vacuum, and very often it is the tail or epididymis; you can always tell by feeling something like nodules in a silk purse. There is nothing in the abdomen that feels like that epididymis. I don't care to catch hold of the epididymis in the canal if I meet it. No matter how much you pull on it, you had better always disregard it, and leave it there and go on and do your abdominal work, then get your epididymis and draw it out again.

Suppose, after separating your fingers, nothing but the soft bowel comes in. What is the next thing to do? Sometimes shifting the patient on the back will release it, but very often it is advisable to have an assistant roll up his sleeve and carry his hand up the rectum; and when he carries his hand away, very often the intestines drop into the hand, while you can't reach it with the fingers. I wouldn't go on up with the hand, although I have taken it with the right hand, but it is better to have some assistance. Say to your assistant, "Go in with your hand until you feel my hand. Now, stir things up a bit." It is very simple.

These patients do a great deal better if they go right out on pasture. I would rather have them on pasture and leave them there. Our infections come from the stable, and when I am required to operate on a case and keep it in the stable, I put a veil of sterile gauze in the canal and put a loose suture into the skin for a few hours, possibly 36, because when he rises, or when the leg is in abduction, he sometimes sucks air through. I would rather that air be sucked through a veil. In other words, I would rather have him out in a pasture where the infections are very mild and don't require anything in the lower canal, and don't give any trouble.

As far as the scar is concerned, suppose we meet an animal with a scar on each side. Very often you can tell whether the castration has been performed at the time the scar was made by simply passing one hand into

the rectum, one hand across the ileum and holding there. Then you can take the scar and pull it down and see whether it tightens on your fingers. If the testicle has been removed and the stump of the cord is down in the canal, the old line of scar tissue will tighten the cord clear up. You take that cryptorchid, however, where the cord is in the abdomen; you can pull the skin of the scrotum down as much as you want to, and you will never feel any tightening of the cord under the fingers. The appearance of the scar doesn't tell you anything. Some will tell you the scar that is not followed by castration is not dimpled in; it is smooth. You have to look for it on the surface. It depends upon how much digging and boring was done at the time of operation.

DR. FERGUSON: This gentleman has covered what I wanted to say. I wanted to speak to the Doctor on preparing the horse by diet. I used to do that when I first started to practice. I find that the abdominal pressure assists materially in the operation.

Relative to the age, I take them when I can get them. We do the operation on Shetland ponies the same. The only difference is in the length of the canal. In the Shetland pony it is probably only 4 inches; probably in the six-year-old it is 6 inches. The larger the horse the deeper the canal.

It is an unsatisfactory proposition to do a quick operation with the technique that you can produce out in the field. What you want is good, safe technique. You can't engineer a complicated technique. You have to make it safe, and the proposition from start to finish, I think, that we all use, that is of most use in this country, is to operate by scrotal incision, not to go over the external ring. If we just pick up the skin of the scrotum and run a scalpel through it, you have a good, big incision and are in the lymphatics or veins. With your two fingers you can separate, and a strain will break the tissues down.

A gentle rotation separates the normal canal tissues, and there is no canal there, but it is all ready to be a canal. Rotate your hand up there with a quarter of a pound to three-quarters of a pound pressure. The tissues break down, and very soon you are at the internal ring. There is not a ring there or what we term the ring. There is a thin spot on the peritoneum. If your fingers are hard on the ends, sandpaper them down so that they are sensitive. If I can manipulate a bit and find the ring there, I slip through there and give it a quick puncture and rotate that, and if it is a young animal, a yearling or two-year, then bring the testicle down through that. Then hold your hand cone-shaped up against the peritoneum and give a punch or two, and if the animal's abdomen is full you can go through the ring and a very slight pull will descend the testicle.

In an older horse, where the organs have been removed—and in those cases there is always a development of the hidden organ—if one is retained and the animal is allowed to go a few years, there is always an enlargement of that. Whether there is a ring present or not, it is dangerous to pull the organ down through that. If you tear that ring, it heals slowly. I prefer to go in front of the ring, make a rupture as close to the ring as possible, and secure the vas deferens. I never look for the testicle. It is absolutely foreign to the operation, and unless it is a complicated affair I don't bother with it. If I find it is too big to pull down through, I try

to diagnose the condition to see if it is a cyst. If I think it is cystic, I cut it.

I agree that the pasture is the nicest place in the world for the horses after the operation. Turn them loose. If the case is in the stable, pack by all means, but the packing creates swelling. If you leave the packing 24 or 36 hours, you have created a swelling that dispels that suction of air, that vacuum of air, and there is no danger of infection.

DR. J. R. FOWLER (Toronto, Canada): Mr. Chairman and gentlemen, I just wanted to say a word about that inguinal canal. I hear some of the gentlemen say there isn't any inguinal canal, and still they use the term. I want to say a few words in connection with that. I believe there is a small number of students here that have heard me describe that inguinal canal. If you don't think there is a canal, just try passing your fingers through any other portion of the tissue. No doubt, gentlemen, we have to imagine to a great extent a canal, as we have to imagine in all work in connection with that. We have to imagine a lot. When we say a canal, we don't mean there is an opening there that we could throw a baseball down; but there is a space filled by a certain amount of tissue in a natural state. It is in a natural position when the testicle has descended and the cord is in place. You will find when you want to go down that you have to break down a certain amount of tissue. We call it a canal for the want of a better name.

There is one other point I want to mention, and that is in the location of the vas deferens. Dr. Ferguson put it very nicely when he said that all he wanted was the vas deferens held in position by the fold of peritoneum, which is not more than $2\frac{1}{2}$ inches. Consequently the vas deferens can not get out of your way any more than 5 inches. If you run your finger down to the side of the pelvic cavity, if you don't come in contact with that, you will find that there is something wrong. The vas deferens must be there, no matter where the testicle is.

DR. BELL: The point about the inguinal canal is important. The inguinal canal is surrounded entirely by the peritoneum. Now, I believe that dropping down back of the abdominal muscle, going through where it is thin, where the testicle pops out of my hand easily, is another point in that operation.

There is still another point. Perhaps you have operated and you didn't make diagnosis of hernia, and the patient had it, and it places you in an embarrassing position. When you attempt to reduce it, you have a good deal of trouble. If you will drop down back of the abdominal muscle, and make your break, as the gentleman said, as if you were going to operate, get hold of the intestines, manipulate them, you will reduce it, as you couldn't otherwise.

THE CHAIRMAN: I am sure there are others who want to speak on this. I believe there are some other points that should be cleared up.

DR. MERILLAT: I think the preference as to the full abdomen is simply a matter of not understanding. I believe everybody will agree that an animal full is not a subject for inguinal castration, neither is the one that is gaunt. It has to be some condition that helps the abdominal retention to bring the testicle to the point of approaching.

PROLAPSUS RECTI AND PROLAPSUS UTERI AND VAGINÆ IN DOGS¹

By J. C. FLYNN, *Kansas City, Mo.*

PROLAPSUS RECTI IN PUPS

PROLAPSUS recti appears most frequently in young, debilitated pups 3 to 6 months old. It may, however, appear without warning at any age.

Cause

Irritation is always the cause. This irritation may be the result of diarrhea, constipation, parasites, trauma, tumors, labor pains, enlarged prostates, and medical agents. Some of the above-named causes do not apply to pups, however.

Symptoms

Difficult, painful locomotion, blood-stained hind quarters and kennel floor. The patient shrinks from and resents examination. A long, cylindrical, bloody mass is seen hanging from and protruding through the anal ring, and presents a semi-solid, deeply plethoric mass, with lacerations from contact with foreign bodies. At the distal end and in the center is an orifice, through which passes, when the animal strains, a few drops of liquid or semi-fluid bloody excrement.

This mass is at first bright red, but after several hours' exposure it becomes darker and more swollen. If not treated it will become ulcerated, and necrotic areas may appear.

This prolapse may vary in length according to breed, age, and intensity of attack, and should not be confused with prolapse of the anus, which never protrudes more than a short distance; nor should it be confused with intussusception of the colon, with the rectum and anus in normal position. The last-named condition can be determined by inserting the finger between the anal wall and the procidence and finding the procidence circumvallated.

Treatment

The unceasing efforts of the patient to inhibit retention makes prolapsus recti one of the most difficult problems of the small-animal practitioner. Palliative treatment corrects such a small per cent of cases that, so far as the writer is concerned, the only success-

¹Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

ful treatment is amputation. This is done in the following manner:

Give hypodermic of H. M. C. As soon as the patient becomes quiet, wrap the protruded mass in cotton saturated in a solution of chlorazene. Hold in place with rubber bands. Sterilize the following instruments: Sixteen small curved needles with silk or catgut sutures, one straight and one curved forceps, one small pair of shears, two or three small artery forceps, one scalpel, one needle holder, one seton needle, one pair rubber gloves. Insert in the seton needle a strong cotton or linen thread about 18 inches long, so one end will be 6 inches and the other 12 inches long. Wrap a piece of cotton on the seton needle about the size of the lumen of the intestine and about 2 inches long. With the 12-inch string wrap the cotton lightly by looping several times, and draw the cotton to a point slightly past the end of the needle. Place this in a solution of chlorazene. Its use will be explained later.

The patient is then placed under a general anesthetic, the protruded mass slipped through a slit in a sterile sheet of rubber or gauze held firmly against the body, and the tail wrapped in sterile gauze. Remove the chlorazene pack, which should have been in place about 45 minutes. Place a rubber band around the mass close to the anus. Insert one jaw of the straight forceps in the lumen of the mass and clamp firmly. Have assistant grasp forceps in one hand and the tail in the other and keep a slight tension on the gut. With the scalpel make a transverse incision on the upper surface, about one-half to one inch from the anus, completely through the tunics of the external tube. Expose just enough of the serous surface of the inner tube to allow a stitch to be taken through the serosa and deeper layers of the anal portion of the outer tube and like layers of the inner tube; tie the stitch and cut off ends closely. Repeat this operation until a complete row of stitches (about eight in number) are taken and the external tube is severed. The median hemorrhoidal blood vessels should be included in the two lateral stitches. Severing only enough tissue for one stitch at a time prevents a twist or flexure in the bowel by preventing the inner tube from moving. Slip the outer tube back out of the way and make a small transverse incision through the tunics of the inner tube, about one-fourth inch from the first line of stitches. The anal portion of the external tube has a tendency to turn back to normal position, which fact aids the operator by bringing the two mucous surfaces closer together. A stitch is then taken to bring the two mucous surfaces together. Do not allow the needle to penetrate the

serous surface of either tube. Repeat this operation until the inner tube is three-fourths severed. Now grasp the anal portion with the curved forceps opposite the remaining strip, sever the strip with shears, and complete stitching. Remove the rubber band from anal portion; insert cotton-wrapped seton needle about one inch. Release curved forceps and replace remaining portion of prolapse. This places cotton pack with equal portion on either side of row of stitches. Slight traction on seton needle and 6-inch string causes the pack to be held in place and the needle withdrawn. The 6-inch string is left protruding. In about 15 minutes the pack should be removed by gently pulling the protruded string, which tightens on the pack and reduces its size.

After-Care

The patient should be kept quiet for two or three days. It is sometimes necessary to administer hypnotics if there is persistent straining. Continue fasting the patient for 12 to 24 hours, according to the strength of the patient, and put on light diet for two or three days following the fasting. A hot sitz bath night and morning tends to soothe the parts.

Objections to Other Methods

All other methods practiced by the writer to correct the condition have either prolonged suffering or caused fatal delay.

Amputation by ligation has the following bad features: Gangrene is produced and held in apposition with the clean, healing tissue, which is not good surgery when it can be avoided. The patient's suffering is prolonged, and there is danger of amputating a fold of intestine and causing death.

Laporatomy and ventro-fixation has the objectionable feature of producing a sharp V-shaped curve in the intestine, and the normal action of the bowel is interfered with and difficult and painful defecation follow as the result of the adhesion.

The tobacco-pouch stitch and use of astringents add to the irritation and cause continued straining and have never produced results for the writer.

PROLAPSUS VAGINÆ AND UTERI

The fact that only about 25 per cent of the small-animal practitioner's patients are females, and only a small per cent of those afflicted with prolapse of the vagina or uterus, makes this ailment rare rather than common. Especially is this true of prolapse of the

uterus, which is not nearly so common as prolapse of the vagina. This condition is extremely difficult to handle in a satisfactory manner both to yourself and your client. Especially is this true in the brood bitch that the owner wishes to keep in service, as the ordinary amputation by ligation or by dissection or any method that tends to lessen the lumen or interfere with the normal function of the reproductive organs can not be used.

Cause

This condition is caused most frequently by difficult whelping. It may also be caused by constipation, diarrhea, cystitis, tumor growths or any irritation that causes straining.

Symptoms

A pear-shaped, red mass is seen protruding from the vulva. This mass is covered with mucus and bloody serum. If of long standing, ulcerated or gangrenous areas appear. The patient strains, licks the hind parts, and makes frequent efforts at micturition. If there is a prolapse of the uterus in connection with the vaginal prolapse, one or both of the horns will be prolapsed, as the uterus in the bitch is so short that when it is everted a portion of one or both cornua will be exposed. I have never witnessed a case where both horns prolapsed. The mass ordinarily is readily replaced within the lips of the vulva, only to be again forced out as soon as the external pressure is removed.

Therapeutics

In brood bitches, replacement by digital manipulations and the use of a blunt instrument or tallow candle, and retention without surgical interference, should be practiced.

After coating with sugar and replacing, a large pressure pad, held in place by a liberal amount of adhesive tape, should be used, and the patient kept quiet for 24 hours. H. M. C. is a good agent to use at this time. Vaginal douche should not be given unless the mass has suffered trauma, as the presence of a foreign matter produces a desire to void which is undesirable at this time.

When the above method fails I resort to the following: Administer H. M. C.; pack the procidence in a solution of chlorazene held in place with rubber bands. Sterilize the following instruments: One scalpel, two rat-tooth, one pair curved shears, rubber gloves, two or three small hemostatic forceps, one pair curved forceps.

Give a general anesthetic. (The operation may be done with local anesthetic, but I prefer a general.) If hard feces are present they should be removed. Remove the chlorazene pack and empty the bladder. With large curved forceps grasp the everted horn by placing one jaw of the forceps within the lumen of the horn and grasp firmly. Withdraw the mass as far as possible and inject a solution of adrenalin. With the scalpel make a small transverse incision one-fourth to one-half inch long (according to the size of the organ prolapsed), through the mucous membrane at the vulvo-vaginal margin. Starting from the perineal surface dissect a strip of mucous membrane the size of the incision in a right oblique line, to the inferior surface of the os uteri. Leave a like strip of normal tissue, and repeat this operation until 50 per cent of the mucous membrane has been removed. For descriptive purposes the surface of the vagina might now be compared to the old-fashioned striped stick candy, the red oblique stripes representing the strips of removed mucous membrane and the white strips the remaining normal mucous membrane. With the curved shears clip several longitudinal pieces equal distance apart from the ring of the everted os uteri and treat the everted horn in the same manner as the everted vagina. After the hemorrhage is controlled apply a liberal application of sugar and replace the organ by digital manipulation and the use of a tallow candle. Apply a pressure pad and leave it in place 24 hours, and keep the animal quiet for two or three days.

The scars formed by the above operation act as a torsion obturator to hold the organ in place. This aided by the longitudinal strips removed from the os uteri and the application of sugar will control a large per cent of cases.

If this operation fails, and there is no gangrene present, I advise celiotomy and ventro-fixation. Where gangrene is present amputation or destruction is advisable.

DISCUSSION

THE CHAIRMAN: We have a short time for discussion or questions on this paper. There ought to be some questions. Dr. Flynn has described a very nice technique, it seems to me, on these operations.

DR. MILLER: Mr. Chairman, I have enjoyed Dr. Flynn's paper very much, and I would like to ask the Doctor to state how strong he makes his adrenalin solution for injection into the tissues.

DR. FLYNN: About one to three-thousandths.

DR. MILLER: I have asked that for a purpose. I have found in general dog practice, in using adrenalin as carefully as in human, for absorption of cocaine, that in the dog it has a detrimental feature. I find in all solu-

tions we get a great percentage of unnecessary sloughing from the use of that, where we are not supposed to get the checking of blood. We get starvation of parts, sloughing of parts, until we can't tell what is coming. The practice in human medicine, especially, is to use those so as to keep down absorption. That has a drawback, especially around parts where there is a lot of cellular tissue, as it will produce sloughing.

THE CHAIRMAN: The point made by Dr. Miller was that in using adrenalin, a dilute solution should be used to avoid sloughing which will follow the use of concentrated solution.

Are there any other questions?

DR. GRUBER: I would like to ask Dr. Flynn if it is not common after the second year—the uterus prolapse after the ninth or tenth day?

DR. FLYNN: As I stated in the paper, it is a rare, uncommon thing in small-animal practice, and I don't doubt at all but what you find more cases in the older bitches; but the cornu has a tendency, after delivery, to prolapse, because it does not have the same strength. I think that is found more commonly in bitches 4 or 5 years old.

DR. FERGUSON: I would like to ask if these cases show very easy or very difficult parturition?

DR. FLYNN: Very difficult.

DR. FERGUSON: That has been my experience in cattle. In cows, it is the lunar uterus that is more apt to prolapse. It is the tardy uterus in the majority of cases, and I would like to ask Dr. Flynn if he figures infection plays any part in the prolapse.

DR. FLYNN: I don't recall ever having a case where I can trace the cause to purely an infection.

TO SPEED UP TUBERCULOSIS WORK

Recognition of the intradermic method of applying the first test preparatory to accrediting a herd as free from tuberculosis, has just been announced by the Bureau of Animal Industry. The more general use of the intradermic test is expected to "speed up" the Federal and State coöperative campaign against tuberculosis.

The Federal recognition of the intradermic method provides, however, that herds undergoing it successfully must pass a subcutaneous test within a year before they can be accredited as free from tuberculosis. The intradermic test has been recognized also by about three-fourths of the forty-five States now coöperating with the Federal Government in the tuberculosis work.

London *Punch* is authority for the following: "It is reported that the muzzling order may come into force again in South Wales. We understand that a dog which thoughtlessly attempted to bark in Welsh in the main street of Cardiff was responsible for the belief that rabies had broken out again."

CLINICAL AND CASE REPORTS

NECROBACILLOSIS IN FISH

By HADLEIGH MARSH, Helena, Mont.

THE observation recorded here is of interest in connection with the widespread occurrence of the *Bacillus necrophorus* in nature and its relation to various forms of tissue necrosis in different species of animals. In this case an organism corresponding morphologically and in staining reactions to *Bacillus necrophorus*, and causing a tissue necrosis similar to the known forms of necrobacillosis, was found to be the predominating organism in necrosis of the gills of certain species of fish.

During July and August of this year large numbers of fish died in the Missouri River and some of its tributaries near Great Falls and Helena, Montana. The State Game Warden requested the assistance of Dr. Starz, chemist for the Live Stock Sanitary Board, in determining the cause of this loss, and Dr. Starz invited me to help in the investigation. We found that the species of fish principally involved were suckers and carp, with few, if any, trout affected. We examined a number of fish of both species and found no evidence of any pathological change except in the gills, which in every case were diseased. They showed more or less extensive patches of necrosis, appearing as a dirty gray area against the bright red of the normal gill. In these areas the mucous membrane of the gill was undergoing necrosis, leaving the skeleton of the organ exposed at the outer edge of the gill.

Microscopic examination of smears from the affected areas showed several different organisms present, but by far the most abundant was a long, slender, Gram-negative bacillus, showing irregular staining, and appearing in places as a network of threads. The appearance was exactly that of the *Bacillus necrophorus*, although there were no very long filaments.

Repeated attempts were made to obtain cultures of this organism, using various media, both anaerobic and aerobic incubation, and different temperatures. A rabbit and a guinea pig were inoculated with some of the original material, and although the guinea pig died, the only organisms isolated from it or from the local lesions on the rabbit were members of the colon group. Neither in cultures nor by animal inoculation were we able to isolate the organism

described above. Probably this could be done in laboratories equipped for pathological work on fish. Other organisms, particularly members of the colon group, were easily cultured from the same material.

Although we failed to isolate the organism in cultures or produce the disease in rabbits and guinea pigs, the very fact that this bacillus, while very abundant in the original material, was difficult to isolate, when considered together with its morphology and staining reactions and the nature of the lesion produced, leads us to believe that the *Bacillus necrophorus* was the primary factor in this gill disease which destroyed great numbers of fish.

ABSTRACTS

INTOXICATION OF RUMINANTS BY THE SECRETIONS OF LOCUSTS. M. Samsonoff. Recueil de Médecine Vétérinaire, vol. 95 (1919), pp. 556-563.

In the spring of 1915 great clouds of locusts descended upon Palestine, gravely injuring crops, etc. Immediately thereafter, an intoxication raged in animals of bovine, ovine and caprine species.

Symptoms.—About half an hour after drinking the animal is seized with dizziness, falls, walks in circles as in cerebral enuresis. This is followed by coma and death unless treatment is soon begun.

The attacks are brought on by cattle drinking water that has been polluted by the secretions of the locusts; the trouble disappeared when uncontaminated water was furnished.

Treatment.—Hypodermic injection of 0.10–0.15 gr. pilocarpine; dry friction on ventral walls; 400–500 grams sodium sulphate; 100–150 grams alcohol; puncture of rumen if tympany is threatening, etc. All patients recovered when treated soon.

The ingestion of live locusts is without effect in animals. The brown green secretion of the locust, as secreted, or diluted with water, is a violent poison, acting particularly on the nervous system. When dried, the secretion loses toxicity completely. This was shown by herds grazing in fields where foliage had dried after locust invasion, with no ill effects. Sorghum was not the cause of the intoxication.

The intoxication is to be attributed to the brown green secretion deposited by the locust on foliage of sorghum or in water; the moisture in the vegetation conserves the toxicity.

W. N. BERG.

A SIMPLE METHOD FOR THE HISTOLOGICAL DETECTION OF IRON.

W. Stoelzner. *Centralblatt für Allgemeine Pathologie*, vol. 30 (1919), p. 225.

1. Into a small beaker containing 1 per cent solution of potassium ferrocyanide, $K_4Fe(CN)_6$, add a small crystal of potassium ferricyanide, $K_3Fe(CN)_6$ and a drop of hydrochloric acid. Stir until the originally pale yellow solution has become deep yellow. Remove the undissolved remainder of the ferricyanide crystal. Immerse the section to be examined for 5 minutes.

2. Rinse in distilled water.

3. Stain with alum carmine.

4. Rinse in distilled water. Imbed in balsam.

This method has the advantage over usual potassium ferrocyanide methods in so far as both ferrous and ferric compounds are detected by it. Its advantage over the ammonium sulfide method lies in the fact that the iron stain is more durable and is less apt to be confused with other pigments.

As to which method is the more delicate, on fresh objects the ammonium sulfide method is more delicate. Apparently the potassium ferro- and ferricyanide penetrate fresh tissues with difficulty, but on fixed histological preparations the proposed method is better.

For the histological detection of iron, tissues should be fixed in alcohol.

W. N. BERG.

INFECTIOUS ABORTION OF SWINE. L. P. Doyle and R. S. Spray.

Journal of Infectious Diseases, vol. 27 (1920), pp. 165-168.

The history of eight herds studied by the authors indicates that infectious abortion of swine is a serious and increasingly important source of loss to the swine industry.

Inoculation of two guinea pigs with triturated afterbirth from an aborting sow resulted in an infection, as demonstrated by the development of agglutinins and typical lesions. At the time of inoculation the blood of the two guinea pigs did not agglutinate a *Bacillus abortus* (Bang) antigen. Four weeks after inoculation the blood agglutinated this antigen completely in all dilutions up to and including 1:500.

An organism was isolated from the liver and spleen of both guinea pigs which, except for slight cultural peculiarities, is indistinguishable morphologically, culturally, or agglutinatively from typical *Bacillus abortus* (Bang).

Rabbit antiserum for four cattle strains and for this swine strain

gave cross-agglutination to the same titer as with the homologous antigens.

Antigen of the swine strain completely absorbed agglutinins from antiserum for each of the four cattle strains.

Antigen of the four cattle strains each completely absorbed agglutinins from antiserum for the swine strain.

NOMA IN THE DOG. J. McL. Phillips and Fred. Berry. *Journal of Infectious Diseases*, vol. 27 (1920), no. 2, pp. 136-138.

The authors record a condition in a dog apparently identical in symptomatology and bacteriologic findings with the disease known as noma in man.

The occurrence of noma in a dog so similar to that in man makes it appear possible that the dog may be a source of infection to man, especially to persons recovering from acute diseases, who are therefore more susceptible to such infection.

The condition was found in a cocker spaniel 9 months of age that previously had developed a mild attack of canine distemper. About the time that he had apparently recovered a peculiar and most offensive odor was noticed about the animal. Examination revealed tumefaction of the right lower lip. Four days later an oval, black eschar appeared on its most prominent point and salivation became profuse. In a few days a conical ulcer formed with a very offensive exudate. This ulcer gradually extended until on the thirteenth day it had eroded into the tissues of the neck and the ramus of the jaw exposing the loosened molar teeth. The dog ate well but seemed very thirsty. Then he became prostrated and pneumonia developed, when he was killed.

Smears made from the surface of the eschar revealed the presence of about equal numbers of fusiform bacilli and spirilla with only a few micrococci and short bacilli. Subsequent smears continued to show a great predominance of *Bacillus fusiformis* and spirilla.

Cultures made from the lesions failed to reveal the presence of *B. f. fusiformis*, while the few spirilla that were found were interpreted as being the result of a direct transfer of the original heavy inoculum and not a multiplication of these organisms.

"Anthrax, which was discovered recently among livestock in a number of southwestern Texas counties, has killed scores of army animals. Five border towns have been quarantined."—*Evening Star*. (August 28).

ARMY VETERINARY SERVICE

WAR DEPARTMENT CIRCULAR 47

W. D. CIRCULAR 47, issued under date of April 1, 1920, and signed by Col. C. R. Darnell, Medical Corps, U. S. A., as Executive Officer, deserves the attention and consideration of American veterinarians out of the army as well as in it, since the experience of the civilian veterinarian in the late war showed most impressively that army matters have more than an academic interest for us. If we ignore army matters in peace times, it will add nothing to our enjoyment of military red tape when we become ensnared in it in war times. By the same token, a general interest in army matters on our part may have a modifying effect on policies affecting the Veterinary Corps in peace times and aid in preserving conditions under which the veterinarian from civil life may find liveable arrangements and opportunity for effective service in war times, two things which were none too common in the lot of the veterinarian in the American army during the late unpleasantness.

Moreover, the potential results of army policies on civilian veterinarians in war times are not the only results which concern us. Army policies may exert an immediate influence on the civilian veterinarian in peace times.

Finally, we must be interested in army policies which affect the army veterinarian as a veterinarian engaged in the same line of work that we are engaged in. It is a phase of veterinary medicine and one which has immediate interest for veterinary students contemplating entering the Veterinary Corps.

On all of the foregoing grounds, Circular No. 47 interests and concerns us. It is entitled "Definition of the Veterinary Service and Its Conduct at Stations Having No Veterinary Officers Assigned." Briefly summarized, this circular has the following topics and provisions:

1. The veterinary service deals with two things: (1) The health and efficiency of animals; and (2) the protection of the human health of the command.

2. The requirements for a veterinary service exist at every station, regardless of its size. The Veterinary Corps is part of the Medical Department. Therefore the veterinary service of any station is part of the Medical Department and *the senior Medical Department officer should be responsible for its proper functioning.*

3. Existing regulations "do not contemplate any supervision of the veterinary service by the surgeon at stations to which veterinary officers are assigned. Until S. R. No. 70 shall have been officially revised, no change in this relationship is authorized." Coöperation between the veterinarian and the surgeon is expected. "The station veterinarian should remember that . . . in performing duties pertaining to human sanitation he is acting practically as technical adviser to the surgeon."

4. "The situation at stations of such limited animal or human strength as not to warrant the assignment of a veterinary officer is quite different. At such places the surgeon . . . is considered by this office to be responsible for the maintenance of the veterinary service."

5. The above situation at stations too small for the detail of a veterinary officer "can be met by the detail of an enlisted man of the Veterinary Corps." Veterinary officers are to train enlisted men in the duties of farrier (i. e., along the lines of animal health) and in meat and dairy inspection (i. e., along the lines of human health from its veterinary aspect). These enlisted men will report to the surgeon, who will assign them to their duties.

6. Surgeons at stations having no veterinary officer will examine their needs with a view to utilizing such enlisted men of the Veterinary Corps.

7. The enlisted men referred to above will be trained in animal management and control, sanitation, prevention of inefficiency and disease, inspection of forage, observation and interpretation of common symptoms, particularly of communicable disease, dosage and administration of medicines, first aid, dressings, bandages, etc. They are not to be stable attendants to sound animals. Under this arrangement, it will be less often necessary to call in civilian veterinarians, but the surgeon may employ such when necessary.

8. The surgeon will place the services of these enlisted men at the disposal of the local supply officer for meat inspection work.

9. At such stations, the surgeon will prepare the necessary veterinary reports.

10. Application for the services of the enlisted men described above are to be made by the various surgeons to the Surgeon General.

If we boil down the foregoing order, it amounts to this: At stations where there is a veterinary officer, he will continue to carry on veterinary duties with the aid of enlisted men who will function under his direction and supervision, and for the present he will continue to take his orders from Veterinary Corps headquarters, but it is strongly intimated there is a change contemplated in this respect, which change will consist in revising S. R. No. 70 to provide that the veterinarian shall report direct to the senior medical officer.

To drive home this point and lay the foundation for the change, it is urged that the veterinarian and surgeon coöperate, and noted that as regards meat and milk inspection the veterinarian is technical adviser to the surgeon. In other words, the subordination and dependence of the Veterinary Corps to the Medical Corps is to be emphasized.

Having thus provided for a pending change in the relations of the veterinarian at large stations, a long step towards establishing the subordination of the Veterinary Corps to the Medical Corps is taken as regards their relations at small stations. Here the veterinary officer finds his equivalent in the combination of a medical officer and an enlisted man of the Veterinary Corps. Inasmuch as the medical officer has not the necessary knowledge and training in veterinary medicine to function along this line, and the enlisted men of the Veterinary Corps also lack this professional training, it is provided that the veterinary officers are to give this veterinary training and education to enlisted men of the corps to enable them to function. But since these men lack the authority of officers, the authority is vested in medical officers. In this way the Veterinary Corps will function—so far as the untrained man who enlists in the Veterinary Corps can function after a sketchy course in veterinary medicine superimposed upon what is usually a very rudimentary education—without authority. Thus at small stations we will have a return to those happy days of a few years ago when the men who did the veterinary work of the army were without authority, but this time, due to the later formation of an enlisted Veterinary Corps, we will have added the fact that these men are also non-professional men of sketchy training and minus preliminary educational requirements.

There are several self-evident objections to the above arrangement which may be briefly stated. First, from the standpoint of the Veterinary Corps, the implied change whereby a veterinarian would report to the surgeon instead of to a veterinary headquarters officer is a step backward. The surgeon is not apt to be informed on veterinary topics or in sympathy with the veterinarian. Medical men are more apt to underestimate the value and importance of veterinary activities and to begrudge recognition to veterinarians than are line officers. If medical men are to direct and supervise veterinary activities, concerning which they are uninformed, it is apt to prove a fruitful source of friction. Two of a trade seldom agree, and two of closely related activities usually agree even less. Medi-

cal men, veterinarians and dentists in the service probably criticize one another more than they do line officers, naturally.

As regards the substitution of a physician and an enlisted man of the Veterinary Corps for a veterinarian, the objections are even more evident. Under normal conditions, the enlisted man of the Veterinary Corps works under the direction of a veterinarian. The niceties of diagnosis, selection of drugs and determination of dosages are matters calling for a veterinarian, not a non-professional enlisted man or a physician or a combination of the two. If the combination is adequate, the next logical step would be to substitute it for veterinary officers at all camps and save money, cutting the number of veterinary officers to a force sufficient to instruct enlisted men for veterinary aids to surgeons.

If the combination is not regarded as adequate, but merely as a makeshift, we may ask whether it is the best makeshift that could be devised. A sick horse is a sick horse, be it one of hundreds or the only one in camp. As such it deserves the attention of a competent veterinarian. If an army veterinarian is available, it is evidently within his province. If such is not the case, it would still appear that the animal requires the services of a veterinarian, and such services are usually available by the employ of a civilian veterinarian. If the services of a veterinarian are not available, the animal is evidently in a bad way. The same would be true of a sick man as concerns his need for the services of a physician, and the combination of a veterinary officer and an enlisted man of the Medical Corps would appeal to physicians and veterinarians alike as a poor substitute for a physician.

Another objection is that the enlisted man will combine the functions of an enlisted man with those of a veterinary officer. He will attend to sick animals, dress wounds and sores, as an enlisted man, and then in his vicarious role of veterinarian, but with a limited appreciation of asepsis, will inspect meat and milk under the supervision of a medical officer uneducated along the lines of such inspection. It would probably be safer and better to have the quartermaster buy only United States inspected meat and certified milk and let the cook pass on the presence of subsequent taint or souring.

The most serious objection to the proposed arrangement is its evident trend away from the ideal of a Veterinary Corps. The slogan "Accept No Substitute" has a certain sound basis, and the proposed arrangement is a substitution of the makeshift for the adequate and the competent. To function properly, the Veterinary

Corps must attain the status of a corps with a general officer at its head, and the long struggle for recognition in the army must continue in that direction. Without a head in the form of a veterinarian of such authority and standing in the army, the corps can never function properly, as the experience of the corps in the late war amply indicates. The English Veterinary Corps and those of the colonials and the French Veterinary Corps functioned efficiently by virtue of such standing and recognition. The German veterinarians since the war have complained that they could not function effectively because they had a general officer only on paper, but not in fact. It would be poor preparation for another war to weaken the authority of our Veterinary Corps, already too weak, and the order under discussion points only too clearly to a policy of permanent and increasing subordination to the Medical Corps. So far as the army veterinarian is concerned, it seems distinctly a step in the wrong direction. In passing, it should be said that there is no feud between the medical and the veterinary officers, any more than there is between physicians and veterinarians in general. The Veterinary Corps is undoubtedly in the hands of friends, but friends may at times err in judgment, especially in the well-meant disposal of a friend's career, and the paternal guidance of the Medical Corps is another instance of a father's *maladroit* kindness in selecting a career for the son. The Veterinary Corps can not unprotestingly adopt a program that threatens to permanently limit its effectiveness, steer it away from the goal of independence, and tie it forever to the apron strings of a corps which regards it as a distinctly subordinate and minor organization.

From the standpoint of the civilian veterinarian, the proposal that veterinary officers instruct enlisted men in diagnosis, therapeutics, theory and practice of veterinary medicine, meat and milk inspection, etc., can not meet with approval. It points too strongly to the likelihood that a number of these men, after functioning as substitute veterinarians under medical officers less familiar than themselves with veterinary matters, will branch out as quack practitioners in private life after leaving the army. Do medical officers prepare enlisted men of the Medical Corps for competition with medical men in civil life as unqualified practitioners? Would it not be a sounder arrangement to provide that a certain proportion of line officers connected with mounted units and transport work be given courses in animal management, shoeing and animal hygiene, as is done in the British army? This would insure a better handling

of animals by the officers actually in charge of them and a better realization of the importance of the Veterinary Corps among line officers, and would simultaneously protect the civilian veterinarian from the likelihood of army-trained quack practitioners, since the line officer is entirely unlikely to branch out in such a field.

Finally, the contemplated action will not render the life and career of a veterinary officer any more attractive to the best veterinary students or tend to elevate the standing of the veterinary profession in general in the United States.

M. C. H.

CORPS VETERINARIANS

The Army Reorganization Act approved June 4, 1920, provides that the Army shall at all times be organized as far as practicable into brigades, divisions and army corps and, when the President may deem it expedient, into armies. The corps areas were announced in War Department orders on August 31, 1920. The appointment of veterinary officers to act as corps veterinarians was recently made in accordance with the order designating the corps areas. The designation of the corps areas with the veterinary officers assigned to them, the corps headquarters and the States included in each corps area are noted below:

First Corps.—Lt. Col. W. V. Lusk; Boston, Mass.; Maine, New Hampshire, Massachusetts, Vermont, Rhode Island, Connecticut.

Second Corps.—Col. G. E. Griffin; Governors Island, N. Y.; New York, New Jersey, Delaware.

Third Corps.—Major W. P. Hill; Fort McHenry, Md. (temporarily Baltimore, Md.); Pennsylvania, Maryland, Virginia, District of Columbia.

Fourth Corps.—Lt. Col. C. Nockolds; Fort McPherson, Ga. (temporarily Charleston, S. C.); North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Louisiana, Mississippi, Arkansas.

Fifth Corps.—Major W. A. Sproule; Fort Benjamin Harrison, Ind.; Ohio, West Virginia, Indiana, Kentucky.

Sixth Corps.—Col. C. D. McMurdo; Fort Sheridan, Ill. (temporarily Chicago, Ill.); Illinois, Michigan, Wisconsin.

Seventh Corps.—Major J. H. Gould; Fort Crook, Nebr.; Missouri, Kansas, Iowa, Nebraska, Minnesota, North Dakota, South Dakota.

Eighth Corps.—Lt. Col. H. F. Steele; Fort Sam Houston, Texas; Texas, Oklahoma, Colorado, New Mexico, Arizona.

Ninth Corps.—Major R. Vane Agnew; Presidio of San Francisco (temporarily San Francisco, Calif.); Washington, Oregon, Idaho, Montana, Wyoming, Utah, Nevada, California.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-seventh Annual Meeting, Columbus,
Ohio, August 23 to 27, 1920

MONDAY MORNING, AUGUST 23, 1920

The Fifty-seventh Annual Meeting of the American Veterinary Medical Association convened in the Auditorium of the Memorial Hall, Columbus, Ohio, at 10:15 a. m., President C. A. Cary presiding.

THE PRESIDENT: I hereby call to order the Fifty-seventh Annual Meeting of the American Veterinary Medical Association. We will now stand and receive the invocation by Dr. Hargraves.

(Rev. Dr. Hargraves delivered the invocation.)

THE PRESIDENT: Ladies and gentlemen, it gives me great pleasure to introduce to you Mr. Hugo Schlessinger, of Columbus, Prosecuting Attorney for Franklin County, who will now deliver to you the address of welcome. (Applause.)

ADDRESS OF WELCOME

MR. HUGO SCHLESSINGER: Mr. President, Officials of the Association, Ladies and Delegates to the Fifty-seventh Meeting of the American Veterinary Medical Association: I know that it is considered to be very poor form and bad taste to begin with an apology, but being an honest politician (laughter and applause) I must be frank with you when I say that I am appearing today merely as a substitute for the real thing. You doctors have been trained, I know, when you send to the drug store to get a certain article, like Glover's Mange Cure, or something of that kind, to accept no substitutes (laughter), but I have it on you today because you have to accept this substitute. Mayor Thomas is out of the city, and that grand old young citizen of Columbus, Colonel Johnny Y. Bassell, whom I have been told by your honorable President you heard in New Orleans, unfortunately was taken sick this morning, and therefore he called upon the Prosecuting Attorney to come here and welcome you.

Now there is no peculiar significance in having the Prosecuting Attorney here, because I don't see a familiar face. (Laughter.) But it is indeed a pleasure and a most distinguished honor to welcome you, ladies and gentlemen, representing one of the greatest, if not the greatest, professions in the world, from all parts of this great Western Hemisphere, into not only the greatest State of these United States, the Buckeye Commonwealth of Ohio, but into the

garden spot of Eden of that State, the city of Columbus. (Applause.)

I am told—and after sitting here and viewing these handsome ladies (applause) and these intelligent-looking gentlemen (applause and laughter) I can scarcely believe it, still your President tells me it is true—that this is the first time this Association ever met, not only in Columbus, but, impossible of the impossibles, in the State of Ohio. (Applause.) Where in the world have you been? Everybody comes to Ohio. The two great parties of this country, after scouring the nation from the Atlantic to the Pacific and from the Great Lakes to the Gulf, have both had to come to Ohio. Just as soon as we get time we are going to move the Capitol of the United States from Washington here to Columbus. (Applause and laughter.) As you all will have to admit, we have been quite busy this summer, at Chicago and San Francisco, but we will get to that in the next few weeks. (Laughter.)

As a layman not versed in your science in any manner whatsoever, aside from having to call upon some of your talent here in the city upon certain occasions to look after a little Boston Bull that I have out at my house, the thought comes to me that you are deserving of more credit, if you please, than men engaged in other branches of the medical profession. Where would we be—we who live and must depend upon the marts of a city for our food—where would we be if it were not for you gentlemen? You are engaged in the daily struggle of work and experience and study and increasing the food supply; yes, that most fundamental food supply, milk, for instance. It seems that by all of your skill and knowledge the farming industry is utilizing everything in their power in order that the great cities throughout the land may have their daily supply of milk for the young. To a very great extent you do your service without any blare of trumpets and shouts of public acclaim, but in many instances the general public not only does not know of the service that you render, no matter how valuable it may be, but with a smile of derision say, "Oh, he is a horse doctor." Yet you continue to do that faithful service to the millions of citizenship of this country, and there is never an instance where a grateful patient of yours dies and remembers you in his will. (Laughter and applause.)

We have in this city one of the greatest universities in the United States, the Ohio State University, and it was with the greatest pleasure that I heard the distinguished President say this morning that the Veterinary College of Ohio University ranked right up with any in the United States of America. We are very proud of that fact. It was my pleasure to attend that university some twenty years ago, and the strides of progress and advancement it has made since that time are a credit not only to the State of Ohio but to the entire United States. I am informed that the Veterinary College has kept right up in the front ranks of progress, and I am sure a great many of the gentlemen present here today have assisted in keeping these

colleges of veterinary medicine up to the high standard which they should and will occupy.

You are welcomed here today, not only by the city of Columbus, but also by the Ohio Veterinary Medical Association, who have banded themselves together to entertain you during your stay in this city this week, and whose guests you will be throughout the various entertainment features. I want to assure you that the city of Columbus is open to you. I am not saying that figuratively; I mean it literally. You don't need view anything with suspicion in the city of Columbus, like a soldier of color who returned from across the sea a few months ago and for the first time in his life had a hundred dollars in his pocket. (This didn't occur in Columbus. It occurred in another city. I am afraid to mention the name because there might be somebody here from there.) He went to the bank on Monday morning and deposited his hundred dollars. That afternoon, as the bank was about to close, he was there and drew out his hundred dollars. The next morning, when they went to open up the bank, they found him out in front, waiting to get in. He came in and again deposited his hundred dollars. That afternoon, just before they closed, he drew it out. On the third morning, when he stepped up with the hundred, ready to deposit it, the cashier said, "Sam, what do you mean by this kind of carrying on, depositing your money and drawing it out?" He said, "Ah'll tell yo', boss. Ah don't know whar yo' folks go when yo' leave de bank." (Laughter.)

So, ladies and gentlemen, you need have no suspicion of that kind while you are the guests of the city of Columbus. Speaking for the quarter of a million citizenship of the city of Columbus, I will say to you that if you see anything you want here, and they don't hand it to you, why, take it, and I will guarantee the protection of the Prosecuting Attorney's office. (Laughter and applause.)

I want to thank you for being here, and I assure you that your presence is appreciated by all of our citizens. I trust that your meeting may be a most successful and happy one. (Applause.)

RESPONSE TO ADDRESS OF WELCOME

THE PRESIDENT: Ladies and gentlemen, it gives me pleasure to introduce to you one of our own men, who really needs no introduction. He is an ex-President of this Association, a man whom you all know. I therefore call on Dr. George H. Glover, of Colorado, to give the response to the address of welcome.

DR. GLOVER: Mr. President, Mr. Schlessinger, Ladies and Gentlemen: On behalf of the American Veterinary Medical Association I wish to express appreciation for these kindly and cordial words of welcome.

In the first place, I wish it to be distinctly understood that I am not the individual who originated Glover's Mange Cure. (Laughter.) If I were, I certainly would not be expected to pose as a

living exemplification of the benefits of this treatment. (Laughter.)

The officers of this Association have always been very considerate respecting the geographical distribution of our meeting places. We have met in New York City, San Francisco, Toronto, New Orleans, and several inland cities.

It has been said that the truth is most often found at a point about midway between the extremes, and that if a relatively small circle be drawn from this point it will represent the area of greatest truth, the area of safety, the area of conservatism. I am reminded that Columbus occupies a position very near the center of population of these United States, and that the great State of Ohio is carved out of a narrow strip of land in the North Temperate Zone where alone it is possible for mankind to attain to the highest possible degree of civilization.

It was said that out of the lair of the wolf came the founder of ancient Rome, and out of the forests of Ohio came the statesmen of young America. Ohio is indeed a great State, and her people are conspicuous for their many virtues, but there is one which I think we may reasonably question, and that is the virtue of modesty. I notice that Ohioans are good boosters, second only to Californians, I presume. When it comes to presidential candidates, Ohio takes the whole bakery—the cookies, doughnuts, pies, candies, the whole cheese. I understand that the pie is to be cut into appropriate sized pieces soon after the first week in November.

Ohio is great, not only for the politicians she has made, but for her achievements in the arts and sciences as well. If I were not already advised in this matter, I would still be bound to believe it, because of a statement in the *Atlantic Monthly*, which is as follows: "By combining coal and iron ore in a furnace, and roasting them together, they have transmuted iron, through steel, into gold." The dreams of the alchemists are at last realized, and this happened in Ohio.

We are indeed glad that we are privileged to meet at this time in the great State of Ohio, in this splendid city of Columbus, at the seat of one of the great universities of America and one of the foremost veterinary colleges. Ohio has been prodigal in the contribution to animal industry, which is the major part of agriculture. I understand that there are more colleges and universities in Ohio than in any State in the Union, and that her public school system is second to none.

Ours is the youngest of the learned professions, and being in position to profit by those who have gone before, we have made wonderful progress. We have made some mistakes, but our efforts may be likened to Kipling's pup that ate shoe blacking, gnawed the chair rungs and tore up the feather pillows, but was all the time getting ready to be a regular dog some day. We are indeed making commendable progress. We have consistently raised our educational standards, and I believe the majority of educators in the veterinary profession are hopefully looking forward to the time

when two years of collegiate work will be required for matriculation in all of our veterinary colleges. Education is the index of civilization, the one ladder by which we can climb, round by round, to higher and better things.

We are mindful, Mr. Schlessinger, of the responsibility which we must assume in accepting your generous hospitality, and we promise to conduct ourselves with dignity befitting the occasion. I wish to extend to you, to the visitors present, and to the citizens of Columbus a most cordial invitation to attend our deliberations, and once more I wish to assure you of our appreciation of your generous hospitality and to thank you for all the good things that have been provided to add to our pleasure and profit on this the fifty-seventh meeting of the American Veterinary Medical Association. (Applause.)

PRESIDENT'S ADDRESS

THE PRESIDENT: Ladies and gentlemen, before I enter into a discussion of my paper I want to make this statement; I expect to deal largely with the internal workings of this organization rather than to tell you something of what we have done in the way of science or any other line of work in our profession. What I say is not to be considered a criticism on past officers or the past of this organization. If I have not a message that will help or be for improvement, I shall have missed what I started out to do. I ask you to be patient with me in a short, suggestive paper, rather than an extended, long discussion. I feel that what I shall say is for the good of the organization and the good of the individual members of this organization, and that is why I mention the conditions that I do.

(Dr. Cary read his address. It was published in the JOURNAL for September, 1920.)

Adjournment.

MONDAY AFTERNOON

The meeting convened at 1:45 p. m., President C. A. Cary presiding.

REPORT OF EXECUTIVE BOARD

THE PRESIDENT: The first thing this afternoon will be the report of the Executive Board. The Secretary will present that.

(Secretary Mayo read the report of the Executive Board, including list of applications for membership.)

(It was voted, on motion of Dr. Kinsley, duly seconded, that the name of Charles W. Bandy be deferred and referred back to the Executive Board.)

(It was voted, on motion of Dr. W. H. Hoskins, duly seconded, that the rules be suspended and that the names read by Dr. Mayo, with the exception of Dr. Buck and Dr. Dunlap, be accepted.)

(It was voted, on motion of Dr. Kinsley, duly seconded, that the rules be suspended and Albert Buck and Dr. Dunlap be elected to membership.)

THE PRESIDENT: We will hear a further report from the Executive Board.

SECRETARY MAYO: The amendments to the Constitution as recommended by a sub-committee of the Executive Board are as follows:

ARTICLE V

Officers

SECTION 1. The officers of the Association shall consist of a President, five Vice-Presidents, a Secretary, a Treasurer, and an Executive Board. With the exception of the Secretary and district members of the Executive Board, they shall be elected at the regular annual meeting and hold office for one year from the date of their election, or until their successors are elected and have assumed office. No person shall be eligible to the offices of President, Vice-President, Secretary or Treasurer unless he has been a member in good standing for the five years preceding his election.

Secretary

SECTION 4. The Secretary shall perform all the clerical duties of the Association, and be custodian of all its property except money, and the properties of the official JOURNAL office. The Secretary may also act as Editor or Business Manager, or both, of the official JOURNAL when so recommended by the Executive Board, and approved by the Association. All moneys received by him shall be paid monthly to the Treasurer. He shall receive such salary and allowance as may be recommended by the Executive Board and approved by the Association.

He shall give bond to the Association in the sum of five thousand dollars (\$5,000), acceptable to the Executive Board. He shall present a written report at the regular annual meeting.

Executive Board

SECTION 7-L. It shall be the duty of the Executive Board to consider and recommend yearly to the Association concerning the selection of a Secretary and an Editor and a Business Manager of the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION. The Editor and Business Manager of said JOURNAL shall receive such salary and allowances as may be recommended by the Executive Board and approved by the Association.

ARTICLE XIII

Editor and Business Manager

SECTION 1. The positions of Editor and Business Manager may be held by the same individual or either or both positions may be filled by the Secretary.

THE JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION shall publish the proceedings, transactions, papers, etc., and such other matter as the Editor may select.

This is a report of the sub-committee of the Executive Board to which was referred the proposed change in the Constitution and By-Laws made at the Philadelphia meeting with reference to combining certain offices.

THE PRESIDENT: You have heard the reading of the amendments as proposed at the Philadelphia meeting and considered and adopted by the Executive Board. What shall we do with that?

(It was voted, on motion of Dr. Kinsley, seconded by Dr. H. Preston Hoskins, that the proposed amendments be adopted.)

THE PRESIDENT: Is there anything further from the Executive Board?

(Secretary Mayo read the list of resignations, including that part of the Executive Board's report having to do with the resignation of Dr. T. E. White.)

SECRETARY MAYO: In explanation, I would say that Dr. White, who has been a member of this Association for about thirty years, is an old man, a sick and helpless man, and he tenders his resignation.

(It was voted, on motion of Dr. Kinsley, seconded by Dr. Kierman, that the rules be suspended and a remittance of Dr. White's dues be made, and that a statement be sent to him by the Secretary telling him that he is still on the roll as an active member, and that his dues be continued from year to year.)

(It was voted, on motion of Dr. W. H. Hoskins, seconded by Dr. Kinsley, that the report of the Executive Board be adopted, and that the action in regard to Dr. White be approved.)

(The other resignations read by Secretary Mayo were accepted.)

THE PRESIDENT: Lest you may not understand and enter into a little difficulty between now and tomorrow morning, let me remind you that your adoption of this amendment puts the election of the Secretary and Editor into the hands of the Executive Board. I was requested to make this statement. This is duly and regularly adopted now, and is a part of our Constitution and By-Laws.

TREASURER'S REPORT

THE PRESIDENT: The next thing in the regular order of business is the report of the Treasurer, Dr. Jacob.

DR. M. JACOB: Mr. President and gentlemen, the printed report of the Treasurer, which gives all of the information, has been distributed among you.

(This report will be printed in a later issue of the JOURNAL.)

(It was voted, on motion of Dr. W. H. Hoskins, seconded by Dr. Kinsley, that the report of the Treasurer be referred to the Auditing Committee.)

SECRETARY'S REPORT

THE PRESIDENT: We will now have the Secretary's report.

SECRETARY MAYO: Mr. President and members of the Association, I hereby submit the stenographic report of the proceedings of the last meeting of the Association held in New Orleans as the official report of that meeting.

THE PRESIDENT: You had that report printed and given to you some time ago. We ought to adopt it, though.

(It was voted, on motion of Dr. W. H. Hoskins, and seconded by Dr. Kinsley, that the report of the proceedings be adopted.)

(Secretary Mayo read his report, as follows:)

This report covers the period of about nine months since the last meeting of this Association in New Orleans.

The Association has about 4,100 members. During the past year 227 have been dropped for non-payment of dues. About 53 have been re-instated. We have lost 15 members by death and 10 have resigned. There are 37 honorary members.

You will note that in spite of special efforts of the Secretary and the active efforts and assistance of the Resident Secretaries, the applications for membership are far below the number for the past two years. This may be accounted for by the fact that the last meeting was only nine months ago, and not a full year. The subsidence of war activities has also been an important factor. A number of veterinary colleges have been dropped from the accredited list and very few veterinarians have been graduated this year. The discouraging effect of congressional reclassification of the Bureau of Animal Industry veterinarians is largely responsible for the small number of B. A. I. applications. They can not afford the small expense. If we assume that there are 8,000 veterinarians eligible to membership in the United States and Canada, something over 50 per cent are members of this Association. The American Medical Association has a membership of about 80,000 out of a total of 140,000 physicians, a little less than 60 per cent. We should make a special effort during the coming year to increase our membership. This is a duty that each individual member owes to the Association. If the members would see personally the veterinarians in their localities and secure their applications, our Association would greatly increase in members and efficiency. It is personal contact that counts. I would recommend that some additional methods of increasing the membership and JOURNAL circulation be devised.

Soon after the last meeting Dr. J. R. Mohler resigned as a member of the Executive Board from the fourth district. Postal cards were sent to all members in this district, and the following were the nominees: Drs. Kiernan, Houck, Turner, Musselman, Benjamin McInnes and G. W. Kinsey. On the postal-card vote Dr. Kiernan received 63, Dr. Houck 44, Dr. Turner 30, Dr. Musselman 30, Dr. McInnes 15, and Dr. Kinsey 14.

The Secretary's office handles more than \$20,000 annually, mostly in \$5 remittances. The funds received are turned over to the Treasurer on the 15th of each month. The financial condition of the Association is excellent, as will be shown by the Treasurer's report. Every member should study the Treasurer's report to know how the Association's funds are expended and invested.

The expenses of the Secretary's office, aside from the Secretary's salary, may be classified approximately as follows:

Printing for Secretary, Executive Board and Resident Secretaries..	\$491.38
Clerical help	380.52
Postage	177.42
Office equipment	30.14
Incidentals	10.24
Expenses attending New Orleans meeting.....	260.36

My assistant, Miss Apland, has handled all the funds of the Secretary's office and looked after the details efficiently and economically.

Possibly the most satisfactory progress made by our profession during the past year has been the securing of a satisfactory and efficient organization of the Army veterinary service. For a quarter of a century the A. V. M. A. has taken the lead in the work to secure such a measure, and it is gratifying that the object has been accomplished. Now that the Army service is well provided for, this Association should make an earnest and active effort to secure just and proper recognition and remuneration for other veterinarians in the United States Government service, the veterinarians in the Bureau of Animal Industry.

The Bureau of Animal Industry is recognized as the most efficient organization of its kind in the world. That this fine organization has made it possible for the American stockman and farmer to supply healthy animals and wholesome animal foods to all the world has been largely due

to the high standard of veterinarians in the Government service. At present the pay of graduate veterinarians, who pass the civil-service examinations and enter the Bureau of Animal Industry, is less than that of an untrained and illiterate day laborer who works under the veterinarians' direction. This condition is unjust to the Bureau veterinarians and to our profession and is seriously impairing the Bureau service. The Bureau of Animal Industry is the largest employer of veterinarians in America, and we should take up this cause not only for the benefit of those already in the service but for veterinarians who may desire to enter the Bureau service in the future. The cause of the Bureau veterinarians is a just one. They need our active assistance and should have it.

Frequent requests come to the Secretary's office for lists of members of the A. V. M. A. and their addresses. The applicants are referred to the JOURNAL Editor. Requests for copies of the Constitution and By-Laws are similarly referred. I would recommend that the Constitution and By-Laws with a list of members be published in pamphlet form and not in the JOURNAL. Since a "proceedings number" is impossible, it may be advisable to combine the business proceedings of the annual meeting with the Constitution and By-Laws in pamphlet form.

A number of complaints against members for violation of the code of ethics have been received. Some of these do not appear to be well founded. Some are due to personal grievances and some of the actions complained are on the border line. In many cases the complainant does not care to prefer formal charges but wants the actions stopped. In several instances the Secretary has assumed the rather unpleasant task of arranging the difficulty to the satisfaction of both parties. The American Medical Association has a Judicial Committee to consider questions involving the ethics of that Association, and I would recommend that our Association consider a similar plan.

This Association has a relief fund amounting to about \$2,100, with no efficient means of utilizing it in case of need or any means of locating cases of need among our members or their dependents. I would recommend that some means be taken by this Association to provide for the proper utilization of this fund.

Several years ago, as Secretary, I called attention to the requests from members for an official A. V. M. A. emblem that could be used as a pin or on an automobile or on stationery. Such an emblem should be useful and add to the advantages of this Association. The San Joaquin Valley Veterinary Medical Association has recently adopted such an emblem. I would recommend that a committee be appointed by the President to consider this matter.

I wish to express my thanks to President Cary, Editor Mohler and other officers of this Association for the cordial support and assistance given the Secretary during the past year. The chairmen and secretaries of the various sections have done splendid work in preparing the program for this meeting, not only for their respective sections but also for the general program. The local committee on arrangements has worked earnestly and efficiently and has coöperated in every way. They merit our thanks.

THE PRESIDENT: Gentlemen, you have heard the report of the Secretary. What shall we do with it?

(It was voted, on motion of Dr. W. H. Hoskins, seconded by Dr. Kinsley, that the report be received and referred to the Executive Board.)

REPORTS OF COMMITTEES

THE PRESIDENT: The next thing is reports of committees. We will call on these committees, and if they are not ready we will

defer their reports until they are ready. Committee on Intelligence. Dr. Way, have you anything to report?

DR. CASSIUS WAY: Mr. President, the committee is not ready to report, and we would like to defer until Wednesday morning.

REPORT OF COMMITTEE ON LEGISLATION

THE PRESIDENT: We will hear from the Committee on Legislation, Dr. Hoskins.

(Dr. W. H. Hoskins, chairman of the Committee on Legislation, read the report of that committee, as follows:)

Thirty years ago at our first meeting in the "Windy City" there came to that meeting in Chicago Drs. Le May, Griffin and Schwartzkopf, members of the United States Army veterinary service. While they expressed the appreciation of Army veterinarians for the interest the members of the United States Veterinary Medical Association had taken in the Army veterinarians, they had come to plead for a larger and more effective interest in behalf of the Army veterinary service.

Renewed pledges by the officers and members were given. A more active committee sought to secure a better recognition for our men in the service; yet the efforts at Washington, appeals and visits to the halls of Congress, were unavailing in bringing relief to those in the veterinary service. Resignations of many men in the service followed year after year when no reward of rank and commission was afforded through the efforts at Washington.

The Spanish-American War followed, and a better conception of how utterly inadequate was our veterinary force in the Army. The embalmed beef scandal will never pass out of history, nor the men responsible for the same ever be forgotten.

Following the Spanish-American War the late Rush Shippen Huidekoper, one of our number, under many assurances of support from those high in political and military power, led the most remarkable campaign in American veterinary history. Over an adverse report of the Senate and House military committees, he passed the measure, creating an Army Veterinary Corps, in both bodies of Congress. The treachery of men in our own profession, in and out of the Army, and others high in military power, including the Secretary of War, defeated in the end his efforts and blasted for nearly a score of years the hopes of any advancement for those in the service.

The granting of pensions and retirement, after the most tragic experiences of several of our number who died or were injured in the service, was achieved through members of this Association coöperating with the men in the service.

In 1916, just one year before our entrance into the great World War, after a nation-wide campaign in the Sixty-second, Sixty-third and Sixty-fourth Congresses, the establishment of a Veterinary Corps with the rank and commission of major as a part of the Medical Corps was attained.

In 1920 the consummation of a thirty years' campaign has brought us the goal of our ambition, and with it three of our number have attained the rank of colonel, all of whom have had more than thirty years of service in the Army as veterinarians in the cavalry, artillery and quartermaster's service. The number (175) accorded in the Army Reorganization Bill, over three times as many as were in the regular service in 1916, with shorter terms for promotion to the various ranks from second lieutenant to colonel, gives to the profession a higher status than it has ever enjoyed; and while the world is war weary and nations broken and demoralized with war debts, we are now assured that it is up to our own members to fulfill every duty devolving upon Army veterinarians, who are now clothed with power and assured of a just reward for a nation's service. That it

shall function with a veterinarian as colonel is the devout wish of every true veterinarian, and any confession of the profession that it has not in its number in the Army veterinary service those capable to fill this high place should be dismissed from our minds.

If this score and a half of years' struggle has not taught the lesson that in union there is strength, then it has not been worth while.

While we have been engaged in this battle, we have not been unmindful that a greater problem confronts us in the status of the veterinarians in the several other Federal services, and especially those in the Department of Agriculture's Bureau of Animal Industry. They are eight times as many in number as the Army veterinarians, and this number needs to be doubled for the larger economic veterinary service of the future of our country in a better control of the great animal scourges by joint action of the Federal and State veterinary services. Let it be remembered that these public servants do not receive as large initial pay as Army veterinarians; that promotions are slow and very limited in number in the higher salaried places; that no pensions or retirement are assured under any like favorable plan; that these members of our profession are wholly engaged in constructive work and the greater and richer triumphs of peace. That this Association, its membership and the profession as a single unit should be behind the necessary legislation that shall give to Federal and State bodies sufficient funds to afford adequate and proper salaries to those of our number engaged in these most needful public services goes without question.

It is a sad comment indeed that neither in the Senate nor House of Representatives of our country is there any record of a member of our profession ever filling a place in these bodies. In but one State has a member of our profession reached the place of Governor, and one could count on his fingers the number of the profession who have sat as members in our State legislative bodies. Yet the problems with which we are concerned and are asked to solve go to the daily well-being of every man, woman and child in our land from infancy to old age.

In closing this report and finishing the five years' period of my appointment on the Legislative Committee and a more or less intimate relation with problems of legislation for the profession for more than a period of thirty years, may I not, in retiring from this place of now greater and greater responsibility, bespeak the necessity of commanding for the profession through this Association, in selecting a future directing head of this committee, one familiar with legislative fields of action, one who can afford to give the major part of his time to this service, and an ample financial support in this most needful field for a better support of the profession and greater assistance to and a more adequate support of veterinary education.

The prospects this year of the smallest entering classes in our veterinary schools for thirty years; the almost extinction of the private veterinary schools with their splendid groups of unselfish men contributing of their ability, their time and money to promote the advancement of veterinary science, will not be supplanted well by the multiplication of weak State schools, inadequately supported and equipped, and the withdrawal of that great body of teachers who were imparting knowledge to student bodies on the subjects they were daily dealing with in the field of personal experience and practice. We need to restrain these tendencies of new State veterinary colleges who draw one or two from the staffs of other colleges from the already small number of capable teachers in our land.

We need sitting representatives in the halls of Congress. We should have one or more representatives in every State legislative body, for the paucity of knowledge among the legislators of matters pertaining to State veterinary sanitary police measures, economic veterinary medicine, the relation of the veterinarian to public welfare, is appalling and its further neglect fraught with tragic sequences.

No committee of this body has a larger field of needful service than the

Committee on Legislation. There has been no time in history when better legislation was demanded to conserve the food and raiment of our more than one hundred millions of people, not to speak of what we must contribute to other nations. Our own nation is increasing in numbers at a rapid rate. The animal food supply is steadily decreasing. Idle lands and congested factories are fraught with danger. No body of men conserve more a people's comfort—comfortable from being well fed, comfortable from ample raiment to protect us from the elements, comfortable minds, free of fear—these are the world's best securities. In milk, in wool, in meat, in leather, in cereals, in the fertility of the soil, in the relationship of animal diseases to mankind, we play the leading part. Shall we measure up to our obligations and responsibilities? Shall we fully serve in guiding and directing wise legislation?

THE PRESIDENT: Gentlemen, you have heard the report of the Committee on Legislation. What shall we do with it?

(It was voted, on motion of Dr. Kinsley, duly seconded, that the report of the Committee on Legislation be adopted.)

REPORTS OF COMMITTEES

THE PRESIDENT: The next is the report of the Committee on Resolutions. I don't know whether they are ready. If you have any resolutions, let them come before the committee. Dr. David White is the chairman.

(The following committees were called upon to report but were not ready: The Auditing Committee, Committee on Necrology, Committee on Anatomical Nomenclature, International Committee on Bovine Tuberculosis, Committee on History, Committee on Abortion, Committee on International Veterinary Conference, Budget Committee, Salmon Memorial Committee, Liautard Memorial Committee.)

THE PRESIDENT: That covers our committee reports.

REPORT OF EXECUTIVE BOARD

SECRETARY MAYO: That reminds me of one item that the Executive Board has recommended.

THE PRESIDENT: If there is no objection, we will go back to the Executive Board report and hear another recommendation from that Board.

SECRETARY MAYO: I have received, as Secretary, the following letter from Professor H. Vallée, Principal of the National Veterinary School of France.

(Secretary Mayo read the letter.)

(The Executive Board voted to recommend that the sum of \$500 be sent to the Anglo-American-French-Belgian Relief Committee, and that we ask for a report as to how the funds have been expended. It was voted, on motion of Dr. W. H. Hoskins, seconded by Dr. Kinsley, that the recommendation of the Executive Board, concerning the above relief sum, be approved.)

THE PRESIDENT: There are some other special committees. If Dr. Welch is in the house, we will hear from the Committee on Coöperation of Veterinary Associations.

DR. W. H. WELCH: I just arrived. I have not been able to get in touch with my committee, and I will ask for more time.

REPORT OF COMMITTEE ON UNOFFICIAL VETERINARY REMEDIES

THE PRESIDENT: We will then hear from the Committee on Unofficial Veterinary Remedies, Dr. H. J. Milks.

(Dr. H. J. Milks read the report of the committee on the feasibility of establishing a permanent committee for investigating and reporting on unofficial veterinary remedies, as follows:)

By "unofficial veterinary remedies" are meant the multiplicity of proprietary articles or preparations now being advertised to the veterinary profession, and in addition such simple non-proprietary and unofficial substances as have also come into general use by the profession.

The term "proprietary article" as here used refers to any chemical, drug or similar preparation used in the treatment of diseases, if such an article is protected against free competition as to name, product, composition or process of manufacture by secrecy, patent, copyright or in any other manner.

The growth of the proprietary remedy goes back to the time when there were introduced to physicians and veterinarians preparations under pharmaceutical names, of known composition, and which were prepared by manufacturers who took pride in their product. They included elixirs, sirups, pills, etc., and were well received by the practitioners. Along about 1875 in human medicine, but somewhat later in veterinary, there began to appear preparations with coined names, protected by law, and with secret formulæ, for which extravagant therapeutic claims were made. Many of these preparations were simple mixtures easily and cheaply made, and consequently there was opened a promising field for commercialism.

The number of proprietary remedies has increased rapidly, and at present the veterinary profession is exploited by numerous manufacturers of proprietaries as thoroughly as are the laity in the use of similar preparations. Added to the almost innumerable list of pharmaceuticals are the bacterins and other biologics which are constantly kept before us.

Your committee does not wish to carry the impression that it considers all proprietaries of questionable value. Such indeed is not the case. There are many that are of great value and which the veterinarian may use with confidence, and furthermore it must be admitted that not all healing agents can be best prescribed or combined extemporaneously. The great difficulty is that we have no way of separating the worthy from the worthless. We are not all chemists or pharmacists, and if we were, we would not have the time to make the necessary examinations.

There is also another side to this question, in that the legitimate manufacturer of pharmaceuticals, or producer of biologics, is working at a disadvantage when compelled to compete with the unethical manufacturer. Just recently a large manufacturer of biologics made a strong appeal for standardizing bacterins. Your chairman also recently received a letter from a manufacturing establishment referring to the "work of this special committee which marks an epoch in the advancement of the veterinary profession."

Of course, compared to official preparations, we see a great deal of propaganda in favor of unofficial ones, but one must consider that the official ones are supposed to be so well known as to need no propaganda. Likewise we should consider that the official preparations of the Pharmacopœia and National Formulary are the result of the labor of the best minds in the country.

The question resolves itself into what can be done to correct this evil, if there be one. The American Medical Association had the same problem to solve. In 1895 its Board of Trustees appointed a committee to look

after the advertising in its journal. In 1900 a board of control, composed of pharmacists and chemists, was appointed, which was to pass on all medicines offered for advertising in the *Journal of the American Medical Association*. The name of the board was changed to "The Council on Pharmacy and Chemistry" in 1905. This Council has always been composed of experts in pharmacy, chemistry, pharmacology and therapeutics. The purpose of the Council is to protect the medical profession and the public against fraud, undesirable secrecy and objectionable advertising in connection with medicinal articles. Among its activities is the publication of a book, "New and Non-Official Remedies," an annual volume describing both proprietary and unofficial non-proprietary remedies which are deemed worthy of use by the medical profession. In order to be admitted to this book an article must conform to certain rules formulated by the Council. The following brief résumé will give some idea of the requirements that must be met in order to be included in this book:

"*Rule 1. Composition.*—No article will be accepted in 'New and Non-Official Remedies' or retained therein unless its composition be furnished the Council for publication.

"*Rule 2. Identification.*—No article will be accepted or retained unless suitable tests for determining its composition be furnished the Council.

"*Rule 3. Direct Advertising.*—No article will be accepted or retained that is advertised to the public. (There are exceptions for disinfectants.)

"*Rule 4. Indirect Advertising.*—No article will be accepted or retained if the label, package or circular accompanying the package contains the names of diseases in which the article is said to be indicated. (Exceptions for bacterins and emergency remedies.)

"*Rule 5. False Claim as to Origin.*—No article will be accepted or retained concerning which the manufacturer or his agents make false or misleading statements as to source, raw material from which made, or method of collection or preparation.

"*Rule 6. Unwarranted Therapeutic Claims.*—No article will be accepted or retained concerning which the manufacturer or his agents make unwarranted or misleading statements as to the therapeutic value.

"*Rule 7. Poisonous Substances.*—The principal label on an article containing poisonous or potent substances must state plainly the amount of each ingredient in a given quantity of the product.

"*Rule 8. Objectionable Name.*—Among other things, articles bearing objectionable or suggestive names will be refused admission.

"*Rule 9. Patented Products or Protected Names.*—The number of which must be submitted.

"*Rule 10. Unscientific and Useless Articles.*—No such article will be accepted or retained which, because of its unscientific composition, is useless or inimical to the best interests of the public or medical profession."

"New and Non-Official Remedies" contains information about the newer agents that can be found in no other book, and it is the only book upon which we can find information upon proprietary remedies worthy of patronage.

Believing that some effort should be made by the American Veterinary Medical Association to solve the problem of unofficial remedies as used by the veterinary profession, and that a body similar to the Council on Pharmacy and Chemistry is essential, your committee respectfully submits the following recommendations:

1. That the Executive Board appoint a body similar to the Council on Pharmacy and Chemistry of the American Medical Association, whose duty it shall be to formulate such rules and interpretations as may be deemed necessary in handling the problem and submit them to this Association for approval at the next annual meeting.

2. That funds be provided whereby this committee may meet to discuss its problems.

H. J. MILKS, *Chairman*,
H. D. BERGMAN,
H. B. COX.

THE PRESIDENT: You have heard the report from the Committee on Unofficial Veterinary Remedies. What shall we do with it?

(It was voted, on motion of Dr. W. H. Hoskins, duly seconded, that the report of the Committee on Unofficial Veterinary Remedies be received and the recommendations referred to the Executive Board.)

THE PRESIDENT: The next committee to report has already reported to the Executive Board and we will not call on the Committee on Combining Offices of Editor and Secretary.

Committee on History. Are you ready, Dr. Adams?

REPORT OF COMMITTEE ON HISTORY

DR. J. W. ADAMS: I was notified on the first of May that I was the chairman of the Committee on History. That notice comes very late in the year, just when the school men are busiest with examinations every day, and I have had no time, up until the latter part of July, to give the matter any thought whatever. I know, however, that, consulting some of the members of the committee, it is not a matter that can be taken up in a short time. For instance, Dr. Higgins, of the committee, has been working, trying to dig up the early history of the Association, and very little of it is recorded. Most of it is in the minds of the older men, some few of whom are still living, and it will have to be gotten by tedious and painstaking correspondence.

Two members of the committee have done some work, but the results are not in shape so that it can be written. I would suggest that the committee for next year be notified before the end of this week, so they may have the winter months to do this reading and carry on this work. If I am a member of the committee next year, it will be a pleasure to do what I can. It is an impossibility for a man to do any of this work in August. He hasn't the time. I think the members of the committee who have done some work should be continued, and it may be that the report next year will be more complete.

DR. R. C. MOORE (Kansas City, Mo.): Last year, or a few years ago, I was made chairman of this committee, under protest, and last year the committee's report was accepted, by motion, I think, of Dr. Hoskins, about continuing the committee. I want to make an explanation, because I feel that an explanation is due the members of this Association. I took it for granted that the committee was continued, and the new committee was not aware that it was appointed. Not hearing anything to the contrary, I started, as best I could, in the winter months, to get the committee to work, and I guess I was at fault by not consulting the JOURNAL. If I had done so, I would have had the copy in my hand, giving the appointment of that committee. Consequently I sent out letters to all our Association secretaries, asking for information and history pertaining to their individual States. I asked the other members of the com-

mittee what plans they thought we should follow, and I have replies from quite a good many of them.

I found out that there had been a change, and I feel that I have put myself in an unfortunate position by "butting in." I have quite a good deal of correspondence from various State associations, some very nicely written reports of the profession in the individual States, and I have all those documents with me and will turn them over to Dr. Adams, as soon as I can arrange it. Doctor, I want to say I am glad I am relieved of the responsibility, but if you need me at any time, I shall be glad to help. The committee can not do much in one year.

I think the wording of the name of that committee is just a little bit wrong. I think the original motion was "The History of the American Veterinary Medical Association." I think our minutes are a history of that Association, but they are a history also of the veterinary profession of America, and that calls for going back even to the first days of this Association.

I was talking with Dr. Higgins a little while ago. He found in Canada, where we have had so much of our education going on, that it takes a great deal of digging to dig up the whole record and get the material that is valuable.

I think, when the report is finished, that we will have a history of our profession that in years to come will be worth a great deal to us. I heartily indorse it. It was not my intention, in going on with this work, to impose on anybody else.

THE PRESIDENT: Gentlemen, you have heard the report of the committee and the explanation of Dr. Moore, and I want to say that possibly I was a little in error in handling this committee because I did not have the printed reports of the meeting in New Orleans, and I did not hear the reports there. However, I think everything has worked out satisfactorily, except notifying the committee earlier, and that was probably my fault. I take the blame for that. I think that committee should be continued without any changes. I would not have made any changes, but I understood that Dr. Moore did not want to be a member of the committee. What will you do with the report?

(It was voted, on motion of Dr. Hershheim, duly seconded, that the report be received, the motion having been amended on motion of Dr. Adams that Dr. Moore's name be added to the committee.)

THE PRESIDENT: I think that covers all the committees. We can not call up any more this evening unless some committeeman has come in who can make a report.

Is there any business that anyone wishes to introduce?

COMMITTEE ON PHARMACOPŒIA

DR. C. H. STANGE: I would like to make a motion that the President appoint a committee of three to arrange for recognition of this Association in connection with the revision of the next Pharmacopœia. (Seconded by Dr. Kinsley.)

THE PRESIDENT: I would also suggest that this committee prepare a list of drugs that we want to take in.

(It was voted, on motion of Dr. Stange, seconded by Dr. Kinsley, that the President appoint a committee of three to arrange for recognition of this Association in connection with the revision of the next Pharmacopœia and also to prepare a list of the drugs that this Association wants to have included.)

THE PRESIDENT: Is there any other business to come before us at this time?

(It was voted, on motion of Dr. Glover, of Colorado, seconded by Dr. R. C. Moore, that the receiving of invitations for the next meeting be made a regular order of business and to come immediately following the election of officers.)

Adjournment.

(Proceedings to be continued)

ECHOES FROM COLUMBUS

At the Columbus meeting the Secretary was instructed to telegraph the greetings of the Association to Dr. E. A. A. Grange, of Toronto, who is confined to his room on account of a cerebral hemorrhage. A letter received from Mrs. Grange states that the Doctor appreciated very much the kind greetings sent by the A. V. M. A. and asked her to express his thanks for the good wishes and his own regret that he is still unable to write himself.

For continuous attendance at A. V. M. A. meetings Mrs. W. Horace Hoskins has made an outstanding record, the Columbus convention being her twenty-fifth consecutive pilgrimage. The JOURNAL extends congratulations and appreciation for this indication of deep interest in the Association's welfare.

As a result of the change in the By-Laws of the Association, the office of Secretary was removed from those filled by the ballot, whereupon both the Secretary and the Editor were appointed by the Executive Board to succeed themselves. This action was subsequently approved by the Association.

The clinic held at the Ohio State Veterinary College on Friday afternoon in connection with the Columbus meeting was of unusual interest, and the attendance was even greater than expected. Prof. D. J. Kays' fine exhibition of the University live stock was the first feature on the program.

This was followed by the demonstration of the reaction to the tuberculin test and the intra-palpebral mallein test with subsequent

autopsy examinations; technique of autopsy on hog-cholera cases; ovariectomy operation on bitch; standing operation for hemiplegia laryngis; scrotal hernia reduction without operation; display of anatomical and pathological specimens.

As it is impossible at this time to do justice to this highly instructive clinic, Dr. Brumley has consented to furnish a detailed report on this subject which will appear in a subsequent issue of the JOURNAL.

During the A. V. M. A. convention at Columbus, a six-course dinner of equine meat products was given under the direction of Dr. W. Horace Hoskins. The menu was as follows:

Dried meat and salami on the table.

First course: Meat and vegetable soup and saltines.

Second course: Steamed roast meat.

Third course: Meat and vegetable stew and rolls.

Fourth course: Liver pudding sandwich; dill pickles.

Fifth course: Lettuce and tomato salad (our own oil for dressing).

Sixth course: Mince-meat pie (our own shortening).

Seventh course: Coffee and cigars.

The following members were participants: Lester H. Howard, Boston; A. T. Kinsley, Kansas City; Editor D. M. Campbell, Chicago; Major Towner; W. G. Hollingworth, Utica; J. F. DeVine, Goshen; S. Brenton, Detroit; David McAuslin, New York City, and William H. Kelly, Albany.

Everyone present heartily partook of the products and all expressed their delight in the opportunity afforded.

DON'T GO BACK ON THE HORSE

"Don't go back on the horse—don't surrender—don't quit the game of raising good horses and mules," so says Secretary Jewell Mayes of the Missouri State Board of Agriculture. The horse and mule business is just now wading through a slough of despondency, a sort of panic or a scare—but public sentiment and farm demands will again turn back quite soon to the horse and mule, it is safe to expect. The tractor and the truck are relentless enemies of the scrub horse, but the worth while horse and mule have a permanent place in the agriculture and transportation of every state and nation.—*K. C. S. Ry. Agricultural and Industrial Bulletin*, August 1.

"The tuberculin test is a prerequisite to the entry of herds at the Trenton Fair, New Jersey, this year."—*Jersey Bulletin*.

OTHER MEETINGS

WASHINGTON AND OREGON VETERINARY MEDICAL ASSOCIATIONS

THE Washington and Oregon Veterinary Medical Associations met in joint session at the Imperial Hotel, Portland, Oregon, August 5 and 6. In the absence of Dr. Smith, president of the Oregon Association, Dr. Ferguson, the president of the Washington Association, presided throughout the meeting. The program was one of the best which has ever been presented at a joint meeting of the two associations. The first paper was prepared by Dr. E. T. Baker of Moscow, Idaho. In his absence it was read by Dr. E. E. Wegner of Pullman, Washington. It was entitled "Some Pointers Learned in Practice." This was followed by the paper by Dr. E. R. Derflinger, Assistant State Veterinarian of Oregon, entitled "An Observation of Some Malformations." Dr. Derflinger reported visiting a farm upon which the last crop of calves had been born with various malformations of the head and especially of the nasal passages.

Dr. A. C. Brown of Vancouver presented a very interesting paper entitled "Veterinary Ethics and Prices." After this had been discussed at length a committee of the two associations was appointed to investigate prices charged and make recommendations to the associations. This committee is distributing a questionnaire for the purpose of gaining information which will lead to definite recommendation to be presented at the joint meeting next year.

Dr. W. H. Lytle, State Veterinarian of Oregon, was next on the program with a paper on "Demineralization." This proved to be a very popular subject. A large proportion of those veterinarians who took part in the discussion seemed to believe that deficiency in mineral content of the food is quite common in both Oregon and Washington. Dr. F. W. Miller of the Agricultural Experiment Station of Oregon read a paper on "Experiences in Forage Poisoning." He reported an outbreak of what seemed to be forage poisoning among horses in a logging camp. The trouble was controlled very satisfactorily through a change in the feed. Dr. J. N. Show of the Oregon Agricultural College gave case reports on the use of bismuth paste in fistulous tracts.

At the evening session, Dr. J. W. Kalkus of the Washington Experiment Station, Pullman, Washington, gave an illustrated talk on "Goiter." This covered the research work which has been con-

ducted by him for the past five years. The lantern slides gave concrete evidence of the success which has been obtained in controlling goiter, since goiter is quite prevalent in several of the Northwestern States, and his paper was very well received.

A large part of the morning of August 6 was devoted to the discussion of tuberculosis and papers on this subject were read by Dr. Clifford Ackley of the Department of Agriculture of Washington and Dr. L. C. Pelton, Chief in Dairy and Live Stock in the Department of Agriculture of Washington. This discussion was followed by a paper by Dr. T. O. Anders of Seattle on "The Marketing of Veal." During the afternoon of August 6, Dr. E. L. Glaisyer of Tillamook opened a very live subject with a paper on "Mastitis." Many of the practitioners joined in the discussion following this paper.

Dr. R. J. Donahue of Tolt, Washington, who is with the Carnation Farm, discussed a breeding record for cows. He emphasized the fact that the veterinarian who is usually called to treat breeding diseases of cattle does not get anything like a complete history of the animals which are to be examined.

The two associations voted to meet together again in 1921, selecting Seattle, Washington, as the meeting place. The time of the meeting will possibly be about August 1. Both the Idaho veterinarians and those of British Columbia are to be extended special invitations to meet with the Oregon and Washington men.

Officers selected for the following year are as follows:

Oregon Association—President, W. B. Coon of Forest Grove; first vice-president, W. G. Morehouse, Salem; second vice-president, C. M. Gardner, Portland; third vice-president, E. L. Glaisyer, Tillamook; secretary-treasurer, B. T. Simms, Corvallis.

Washington Association—President, R. A. Button, Tacoma; vice-president, G. A. Jones, Sedro-Woolley; secretary-treasurer, Carl Cozier, Bellingham.

Dr. L. C. Pelton was toastmaster at the banquet on the night of August 6. The feature of this banquet was a chalk talk by Dr. E. V. Edmonds of Mt. Vernon, Washington. *

The two associations decided to invite the American Veterinary Medical Association to meet in Portland some time in the near future. The fact was brought out that the American Association has never met in any of the States of the Pacific Northwest.

CARL COZIER, *Secretary*. *

NORTHEASTERN VETERINARY MEDICAL CLUB

The Northeastern Veterinary Medical Club met at Wilkes-Barre, Pennsylvania, July 16. Those present were taken to the hospital conducted in connection with the Lehigh and Wilkes-Barre Coal Company and supervised by Drs. E. E. and Ernest Hogg, where a clinic was held. Dr. John W. Adams of the University of Pennsylvania operated on several subjects.

Dr. F. A. Marshall demonstrated the uterine douche treatment for abortion and sterility and also performed rumenotomy on a cow.

Following this clinic the meeting reconvened at the hotel, where luncheon was served to the following members:

Howard C. Reynolds, E. E. Hogg, Ernest Hogg, Thomas James, E. P. Althouse, V. R. Lidstone, J. W. Adams, N. H. Allis, F. A. Marshall, F. A. Davis, E. E. Brosnan, G. B. DuBois, H. T. McNeal, Fred Catlin, Fred Stehle, Calvin Bennett, H. Leutholt, A. B. Cole, R. S. Detwiler, E. S. Stone, John Rink, A. E. Hollister, P. N. McNeal, F. J. McNeal, L. E. Meade, H. W. Barnes, F. H. Chandler, and H. R. Church.

Following this luncheon, Dr. Adams gave a very interesting talk on anesthetics, surgery, and restraint of animals.

Dr. F. A. Marshall talked on abortion and sterility disease and rumenotomy.

Deputy State Veterinarian H. R. Church outlined work as it is carried out by the Pennsylvania Bureau of Animal Industry.

These talks brought out very liberal discussions in which practically everyone present participated.

Dr. Ernest Hogg, Wilkes-Barre, Pennsylvania, was elected president for the ensuing year.

H. R. CHURCH, *Secretary*.

UNIVERSITY OF PENNSYLVANIA ALUMNI MEETING

The Veterinary Alumni of the University of Pennsylvania assembled at the Veterinary School at 9:30 a. m., June 12, 1920, to celebrate Alumni Day.

Dr. C. J. Marshall gave the welcoming address and then conducted a clinic in which the Albrechtsen uterine douche treatment, the serum-virus method of treating hogs, and the proper method of tuberculin testing were thoroughly and capably demonstrated by the members of the graduating class, who also gave statistics regarding their work in Dr. Marshall's Ambulatory Clinic.

Dr. John W. Adams then demonstrated the operation for the relief of roaring.

Dinner was served at noon in Leonard Pearson Hall to the alumni and their guests.

Various alumni affairs were discussed at the business meeting which followed the dinner.

At 2:30 p. m. the members proceeded to Franklin Field, where a ball game was played between the universities of California and Pennsylvania, after which many of them attended numerous other university activities.

During the day approximately 125 alumni were present. All seemed to enjoy themselves and unanimously expressed the hope that a similar program would be arranged for next year.

M. F. BARNES, *Secretary*.

OKLAHOMA VETERINARY MEDICAL ASSOCIATION

The Oklahoma State Veterinary Medical Association held its fifth annual meeting on July 6 and 7 at the Lee Huckins Hotel, Oklahoma City, with fifty-five members present.

Thirteen new members were accepted by the association.

Papers presented for discussion included "Notes on Transportation of Cattle and Hogs," by Dr. H. A. Roscoe; "One Million Sheep in Oklahoma by 1923," by C. L. Nelson; "Notes on Tuberculin Testing," by Dr. T. A. Jones; "Progress of Tuberculosis Control in Oklahoma," by Dr. E. V. Robnett, State Veterinarian; "Professional Ethics," by Dr. O. S. Gould.

The round-table talk was conducted by Dr. Walter H. Martin.

On the evening of the 6th, a banquet was held at the hotel. About sixty members with their wives and friends were present, and an enjoyable program was offered.

New officers elected for the following year are: Dr. C. H. Anthony, president; Dr. J. E. Nance, vice-president; Dr. H. Wood Ayers, secretary; Dr. C. C. Hooker, treasurer.

H. WOOD AYERS, *Secretary*.

JOINT PRACTITIONERS' MEETING

A joint practitioners' meeting, arranged by the British Columbia and Washington State Veterinary Associations, was held in the Chamber of Commerce, Bellingham, Washington, on July 24.

There were fifteen members present from British Columbia and about the same number from Washington State.

Mayor E. T. Mathes and J. A. Miller, secretary of the Chamber

of Commerce, made short speeches of welcome, after which Dr. L. C. Pelton, State Veterinarian, and Dr. A. J. Damman, president of the British Columbia Veterinary Association, were elected as joint chairmen, this being necessary on account of the fact that Dr. Pelton had to leave before the finish of the meeting. Dr. K. Chester, secretary of the British Columbia Veterinary Association, was chosen secretary of the meeting.

After a few words from Dr. Pelton he called upon Dr. G. Jones of Sedro-Woolley, Washington, to read his paper on "Torsion of the Uterus in Cows and a Method for Its Reduction." This was followed by general discussion of the different methods used by different practitioners and the results. Dr. T. H. Jagger of Vancouver, B. C., then gave a very interesting address on "Some Phases of the Causes of Sterility." Dr. Jagger's remarks showed how necessary it was to make a very careful and thorough manual examination of all the genital organs in trying to ascertain the cause of sterility. Dr. Jagger is specializing in this work and is following the method of Dr. Williams, who visited this Province as the guest of the British Columbia Veterinary Association. At the conclusion of the remarks, considerable interesting discussion ensued which lasted for an hour. Mention should be made of a highly educational discussion between Dr. A. Donahue of Seattle, Wash., and Dr. Jagger, the former having lately taken up the subject as the result of being in charge of a large dairy farm. The account of his difficulties and conclusions, brought out in his questions to Dr. Jagger, and their answers, were most useful to the others present.

Dr. J. W. Kalkus, Pathologist of the State College at Pullman, Wash., questioned whether Dr. Jagger's method, which he has found financially beneficial in British Columbia, would be practical in small grade herds of the State of Washington.

The next paper read was by Dr. C. S. Phillips of Mt. Vernon, Wash., on "Various Obstructions in Cows' Teats." Dr. Phillips described his method of removing them, having lately had better results than formerly.

Then Dr. T. E. Sleeth of Vancouver, B. C., gave a very technical paper on "Abdominal Operations in the Dog."

Dr. Sleeth is a very successful canine surgeon, and his preparation of the patient and surgical technique would do credit to any human surgeon. Considerable discussion followed, particularly in regard to the Cæsarian operation, with which Dr. Sleeth has had good success.

Prof. H. E. Upton of the Canadian Soldiers' Settlement Board then spoke on the "Opportunities and Chances of Financial Success of the Treatment of Diseases of Poultry by the Veterinary Practitioner." Prof. Upton explained that he was asked to come to this meeting of veterinarians by Dr. K. Chester, who stated that he thought considering the amount of vaccination now being done on poultry and the various diseases occurring in poultry, together with the increased value of the birds, that the time was now opportune for the practicing veterinarian to add the poultryman to his list of clients.

Prof. Upton gave a most interesting address on some of the diseases of poultry, and the preparation and administration of the various vaccines, which he has found as the only way of treating and preventing such diseases as diphtheritic roup, etc. He mentioned the fact that coccidiosis was causing considerable loss to the poultryman, and not very much was known about it, and he thought the veterinarian was the man that the poultryman should look to for relief.

Lively discussion followed and Prof. Upton was accorded a hearty vote of thanks.

The meeting then adjourned to the Hotel Leopold, where the members partook of a fine chicken supper. They then returned to the Chamber of Commerce, where humorous cartoons and drawings were made by Dr. E. V. Edwards of Mt. Vernon, Wash., after which Dr. J. W. Kalkus of Pullman, Wash., gave a detailed address on "Goiter in the New Born." He explained the subject by lantern slides, showing experiments carried on by the State College of Washington in investigating the cause of goiter in the new born, which is very prevalent in certain valleys of the State, where there has been no normal increase in some classes of stock for some years.

Dr. Kalkus' experiments, however, showed conclusively that if iodine is administered either in the form of potassium iodide, or tincture of iodine rubbed into the skin during the period of gestation, a normal birth occurred in every case, even in animals that had given birth to an abnormal fetus the previous year.

The arrangements for this most successful meeting were excellently carried out by Dr. C. Cozier of Bellingham, Wash., the secretary of the Washington State Association, and it was the expression of all present that similar joint meetings should be held in future.

KENNETH CHESTER, *Secretary.*

